uPrint™
by dimension

User Guide

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The *uPrint* by Dimension system conforms with the following standards, in accordance with the EU Machinery, Low Voltage and Electromagnetic Compatibility Directives: EU 98/37/EEC, EU 73/23/EEC amended by 93/68/EEC, EU 89/336/EEC

STRATASYS®

Declaration of Conformity

Manufacturer	**Stratasys, Inc.** **7665 Commerce Way** **Eden Prairie, MN 55344-2080**
Type of Equipment	**3D Printer**
Model Number	**180-00108 uPrint 3D Printer** **180-00109 uPrint 3D Printer** **180-00110 uPrint 3D Printer**

We declare under our sole responsibility that the devices mentioned above comply with the following EU Directives:

Electromagnetic Compatibility (EMC)	**89/336/EEC**	
Machine	**98/37/EC**	
Low Voltage	**73/23/EEC amended by 93/68/EEC**	
Common Technical Specification Used for demonstration of Compliance	**EN55022:1998** **EN55024:1998** **EN60950-1:2006**	**EN6100-3-2: 2003** **EN6100-3-3: 1995**
Date of Validity:	**September 8, 2008**	
Design and Technical Construction File maintained at:	**Stratasys, Inc.** **7665 Commerce Way** **Eden Prairie, MN 55344-2080**	
Name of Authorized Signatory:	**S. Scott Crump**	
Position Held in Company:	**Chief Executive Officer**	
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(b)Stratasys' Customer Service Department was not notified of the defect or malfunction of the uPrint™ system prior to expiration of the one year warranty period.

(c)Parts or consumables were installed and used that were not certified or approved by Stratasys.

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Introduction

uPrint is designed with ultimate simplicity in mind. The system enables you to build parts quickly, even if you've never used a 3D printer before.

The system models with ABS*plus*, so modeled parts are strong and durable. ABS*plus* also ensures you will be able to drill, tap, sand and paint your creations. With Soluble Support Technology (SST), your completed parts are quickly available for review and test. *uPrint* is an innovative combination of proprietary hardware, software and material technology.

Welcome to the new Dimension of 3D modeling!

How To Use This Guide

This User Guide is laid out in easy to follow sections which cover Set-up, Operation, Maintenance, and Troubleshooting of your *uPrint* 3D printer. Be sure to read each section carefully so that you will get the best performance from your system.

Throughout the User Guide, text representing **Interface Messages** that appear on the Display Panel are presented in a bold font.

Sections of the User Guide

Overview...

Provides a quick reference for the layout of the printer and its operating components. Overview also provides a quick reference for sources of additional information.

Setup...

Guides you through the initial printer installation and setup. Topics include:

- Unpacking
- Connecting power
- Installing software
- Connecting to a computer network.

Generally, topics in setup are only accomplished during installation or relocation of the printer.

Operation...

Further develops your understanding of the printer by explaining:

- The User Interface
- Adding and removing material
- Building parts
- Removing completed parts and support material.

The tasks presented are common procedures accomplished during the normal operation of the printer.

Preventive Maintenance...

Lists several tasks to be done on a periodic basis.

Troubleshooting and Maintenance...

In the event your printer has any issues, a troubleshooting checklist, fault determination codes, diagnosing a Loss of Extrusion, recovering from a Loss of Extrusion, startup and networking issues resolutions are provided. This section also lists routine procedures that keep your printer functioning at its best.

Support...

Guides you through getting technical support and/or service for your *uPrint* 3D Printer, as well as consumable products and ordering information.

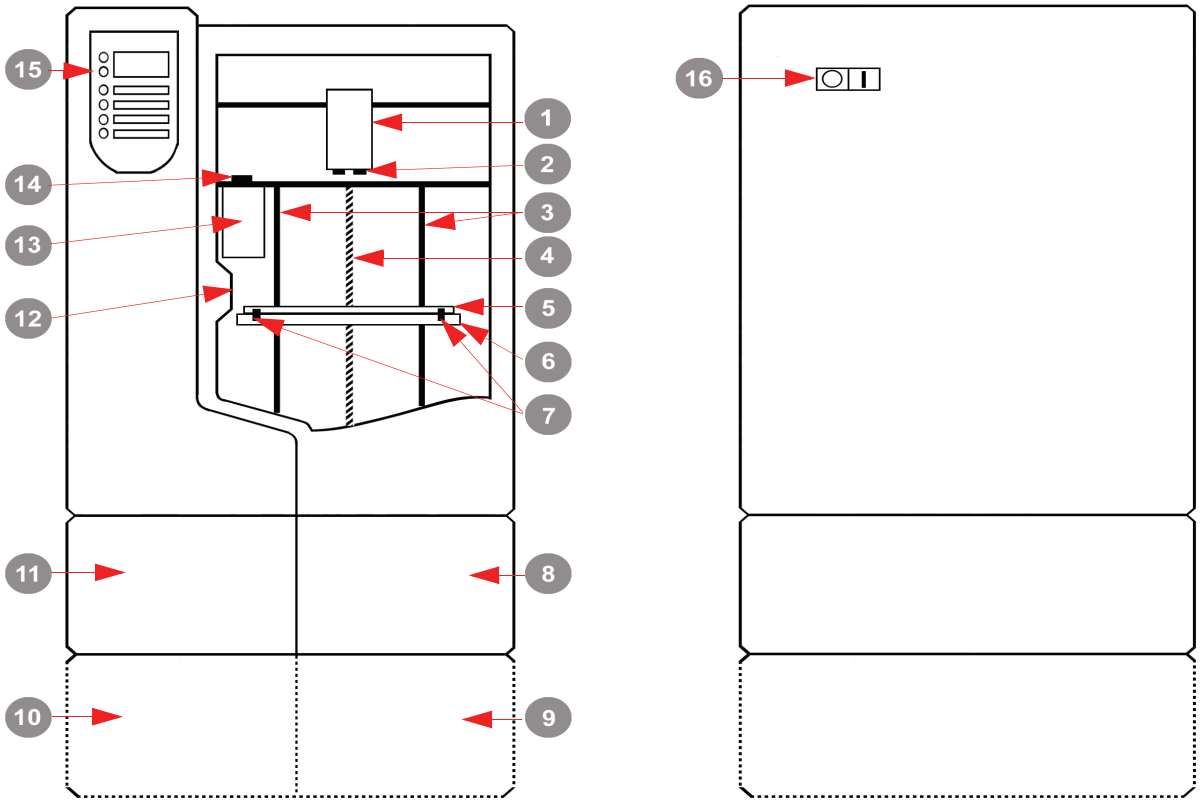
Recycling...

This section will explain which materials for the *uPrint* system and packaging are recyclable.

Overview

uPrint builds models from CAD STL files. The system builds three-dimensional parts by extruding a bead of ABS*plus* through a computer-controlled extrusion head, producing high quality parts that are ready to use immediately after completion.

Figure 1: Front and left side view of printer.

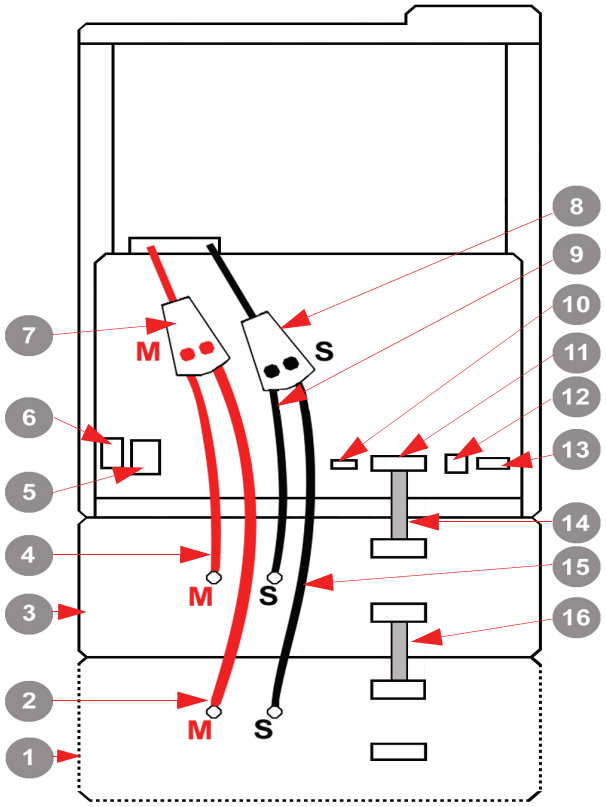


Front View

Left side View

1	Extrusion Head	9	Optional Material Bay, Model Side
2	Extrusion Tips	10	Optional Material Bay, Support Side
3	Guide Rods	11	Material Bay, Support Side
4	Lead Screw	12	Door Interlock System
5	Modeling Base	13	Purge Bucket
6	Z Platform	14	Tip Wipe Assembly
7	Modeling Base Retainers (2)	15	Display Panel
8	Material Bay, Model Side	16	Power ON/OFF Switch

Figure 2: Rear view of printer



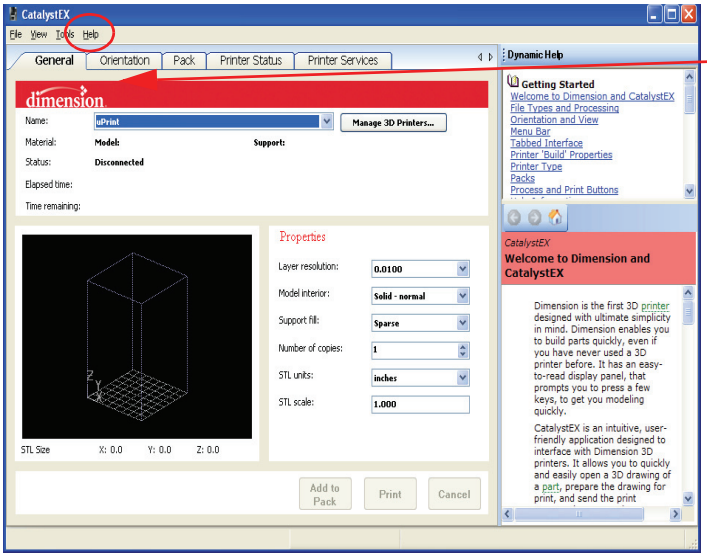
1	Optional Material Bay	9	Support Material Tube
2	Optional Model Material Tube	10	UPS Connection
3	Material Bay	11	Material Bay Cable Connector
4	Model Material Tube	12	RJ-45 Network Connector
5	Circuit Breaker	13	Diagnostics Cable Connector
6	AC Power Cord Connector	14	Material Bay Communications Cable
7	Model Material Y Connector	15	Optional Support Material Tube
8	Support Material Y Connector	16	Optional Material Bay Communications Cable

The *uPrint* system consists of two primary components — the *uPrint* 3D printer and Material Bay. CatalystEX is the preprocessing software that runs on Windows XP Pro or Windows Vista platform.

uPrint's build envelope measures 203 x 152 x 152 mm (8 x 6 x 6 in). Each material carrier contains 492 cc (30 cu. in.) of usable material — enough to build continuously for about 48 hours without reloading. You can add an optional material bay that will automatically load more material as a carrier runs out.

Finding More Information

Other references are available for use with the *uPrint* system.



CatalystEX Online Help

Simple operating instructions for CatalystEX are available through CatalystEX Dynamic Help, which is included with CatalystEX and displayed in the Dynamic Help window. You can also see CatalystEX Help from the menu bar - **Help>Contents**

World Wide Web

Additional information is available at: http://www.uPrintDimension.com

Setup

Minimum Requirements:

Workspace Requirements:

System Specifications	
Printer Height	762mm (30 inches)
Printer Width	660mm (26 inches)
Printer Depth	660mm (26 inches)
Printer Weight	62 Kg (137 lbs.)
Material Bay Height	153mm (6 Inches)
Material Bay Width	660mm (26 inches)
Material Bay Depth	660mm (26 inches)
Material Bay Weight	17 Kg (37 lbs.)
Ventilation Requirements	115 mm (4.5 in) minimum space behind unit for air circulation. 153 mm (6 in) minimum space around the printer for air circulation.
Installation Location	Stable flat surface capable of holding 100Kg (220 lbs).

Facility Requirements & Environmental Specifications:

Facility Requirements	
Dedicated outlet voltage requirements (Nominal):	90-132 VAC, 47-63 Hz, 12 Amp minimum (20 Amp recommended) –or– 195-264 VAC, 47-63 Hz, 7 Amp minimum (10 Amp recommended)
Ambient Temperature:	15-30°C (60-86°F) Operating
Relative Humidity:	30-70%, Non-condensing Operating
Network connection:	Ethernet 10/100 Base T
Optional UPS for power interruptions:	Rated Power – 1440 VA Output Power – 1500 watts
BTU/hr	2550 BTU/hr
dBA's (Decibels)	55dBA MAX Idle and 62dBA MAX Operating

Work Station Requirements:

You must use a CAD software program that is capable of creating. STL files. For detailed information

See Release Notes... http://www.uPrintDimension.com

Safety

uPrint is designed to be a safe and reliable 3D printer. However, normal operation will require that you access areas of the printer that are potentially hazardous.

Hazard Classifications:

Please be aware of the following hazard classifications that are used throughout this guide.

CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in serious injury.

Hot Surface: The hot surface sign indicates the presence of devices with high temperatures. Always use extra care, and wear safety gloves, when working around heated components

Gloves: When performing some maintenance procedures, the machine may be hot and gloves will be required to avoid burns.

Safety Glasses: Wear safety glasses to avoid injury to your eyes.

Lifting Hazard: Lift with two or more people to avoid serious injury.

Recycle: Use proper recycling techniques for materials and packaging.

ESD: Use standard electrostatic discharge (ESD) precautions when working on or near electrical circuits.

Unpacking the Startup Kit

1. Carefully cut the top of the box, open and remove the contents.
2. Remove the welcome kit box and open.
3. Remove the model and support material spools.
4. Remove the material guide tubes.
5. Remove the box of substrates.

Figure 3: Startup Kit

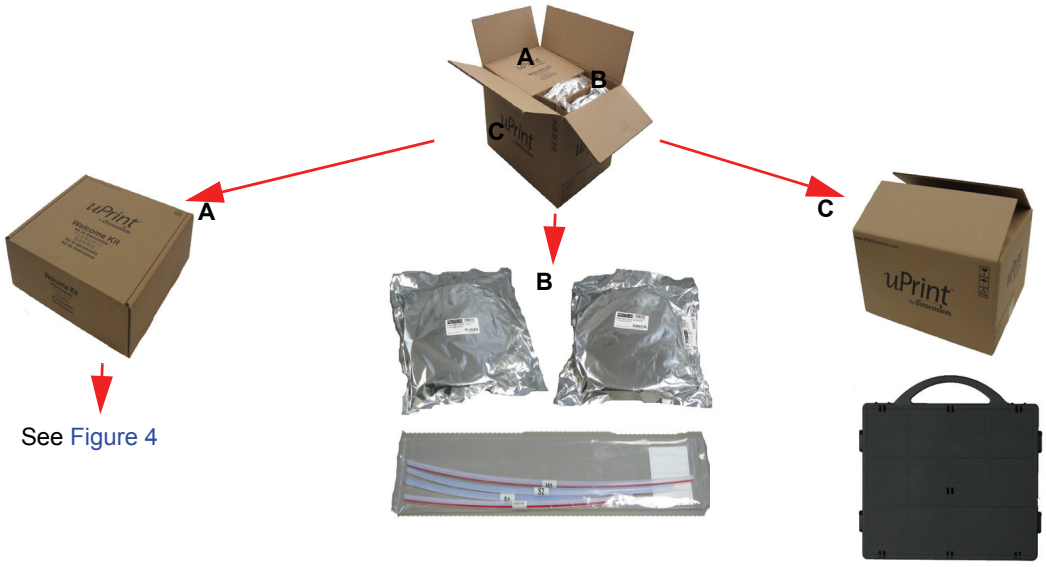
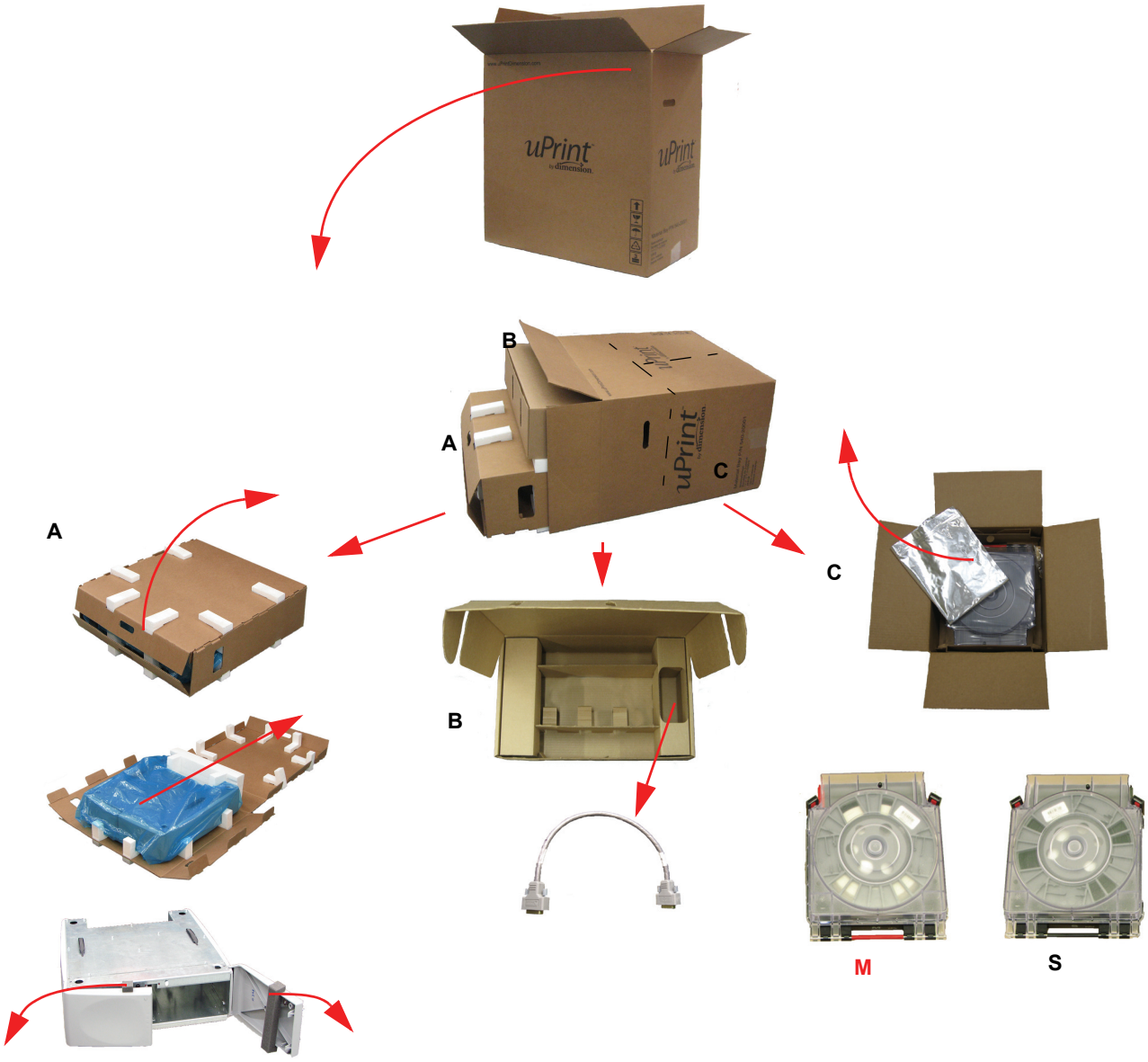


Figure 4: Welcome Kit Contents

Unpacking the Material Bay

1. Carefully cut the top of the box, open and lay it on its side.
2. Remove the material bay cable.
3. Remove the material bay.
4. Remove the model and support carriers.

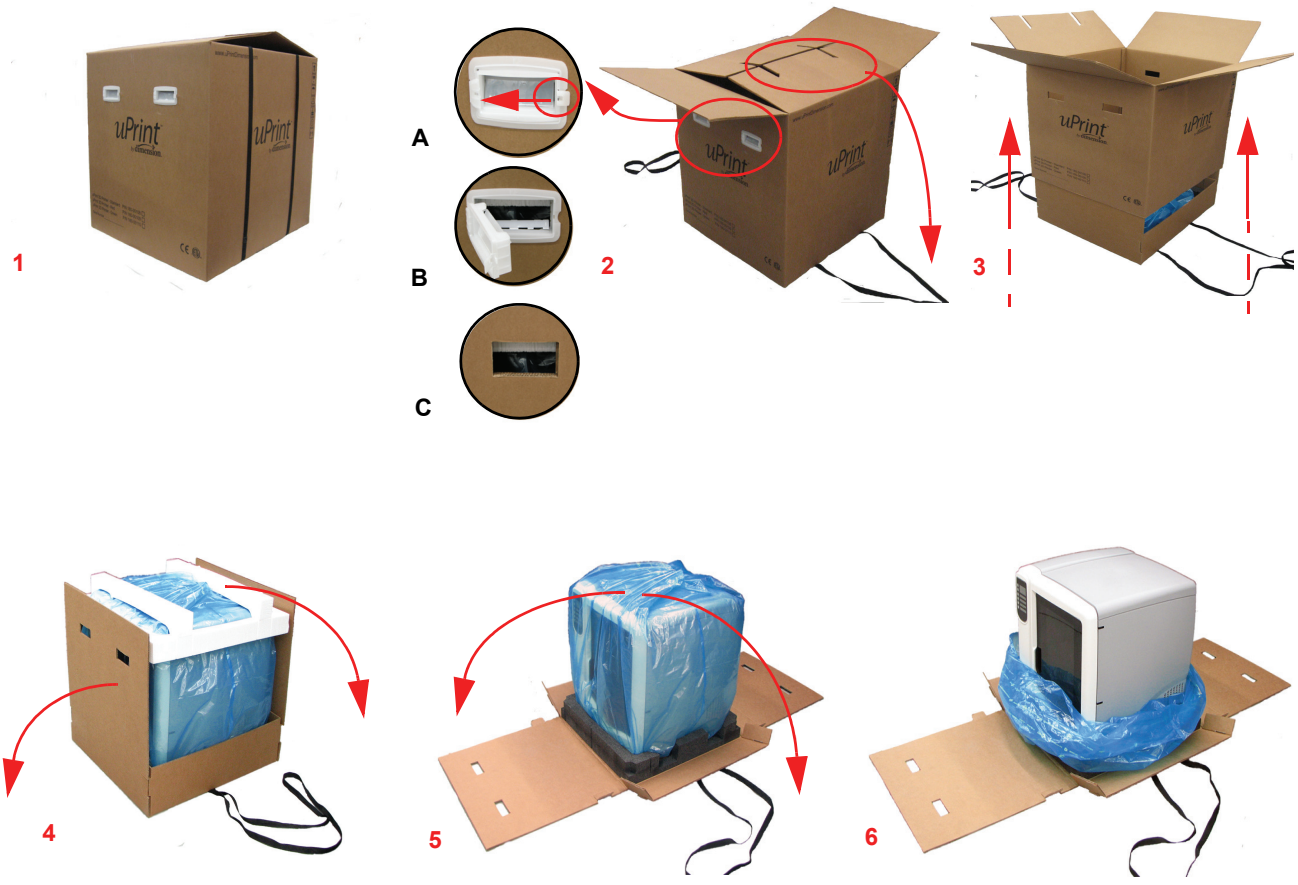
Figure 5: Material Bay



Unpacking the Printer

1. Place the printer close to the area where it will be located.
2. Remove the handles from the box.
3. Carefully cut the top of the box open, do NOT cut the straps that contain the box.
4. Unfold the top of the box and remove the straps.
5. Remove the handles, pulling the tabs outward.
6. Raise the outer box up and off of the inner box.
7. Fold down the sides of the inner box to reveal the printer.
8. Remove the foam from the top of the printer.
9. Cut the top of the blue plastic bag the printer is enclosed in.
10. Lower the plastic bag, the printer should now be visible.

Figure 6: uPrint 3D Printer



Set up the Material Bay and Printer

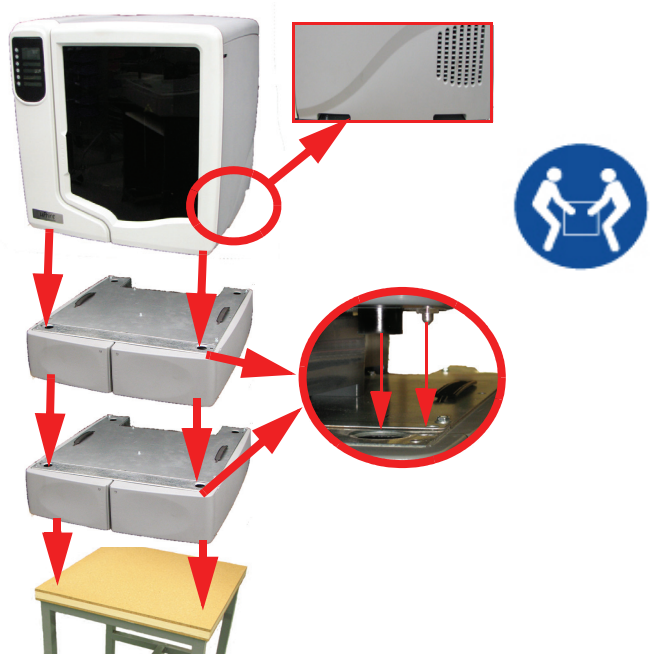
Once the Printer and the Material Bay are unpacked, they will need to be aligned and stacked before operation.

1. Place the Material Bay on a stable, flat surface where you will have your *uPrint* 3D printer located.
2. The Material Bay has 4 holes for the feet and 2 holes for the alignment pins. See Figure 7. These must be seated properly for mechanical stability.
3. Align the 4 feet and 2 two pins on the bottom of the printer with the holes on top of the Material Bay and set in place. See Figure 7.

LIFTING HAZARD

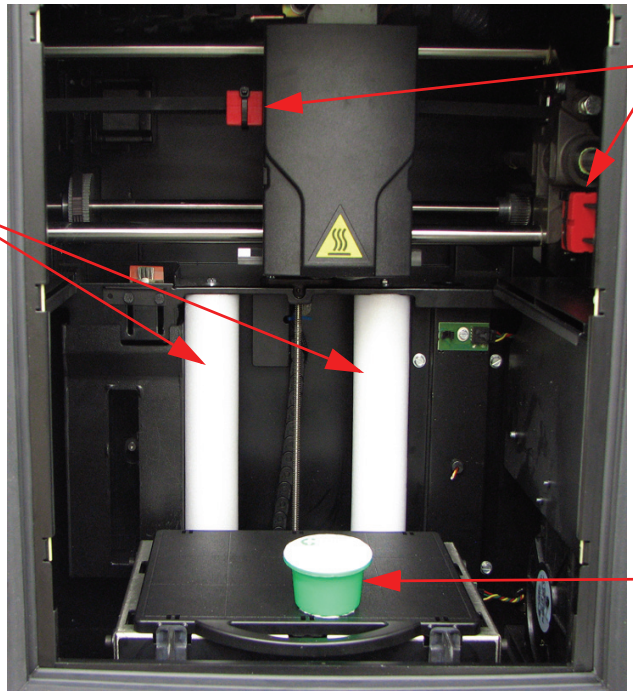
Use proper moving and lifting techniques when positioning the unit.

Figure 7: System Stacked (Shown with optional Material Bay)



4. Open the printer door and remove the substrate and VCI emitter and discard. See Figure 8.
5. Remove the shipping foam from the Z stage guide rods and recycle. See Figure 8.
6. Remove the belt retaining clips and recycle. See Figure 8.

Figure 8: Open the chamber door and remove shipping materials


Remove belt retaining clips and recycle.
Remove shipping foam from Z stage guide rods and recycle.
Remove modeling base with VCI emitter and discard

WARNING

The Lead Screw and Guide Rods are lubricated with a thin coat of Krytox grease. Krytox grease can cause skin irritation. Be careful not to get the grease on your hands or clothing.

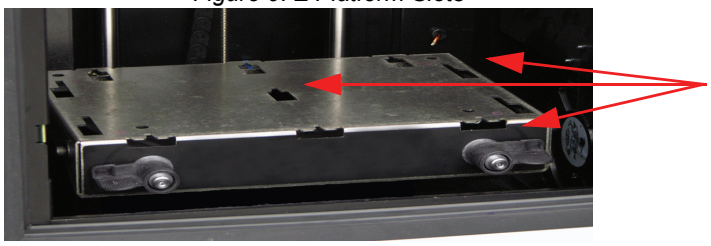
Inserting a modeling base

The modeling base is the tray the printer uses to build the models on. You will need to use a new modeling base for every build.

Inserting a modeling base:

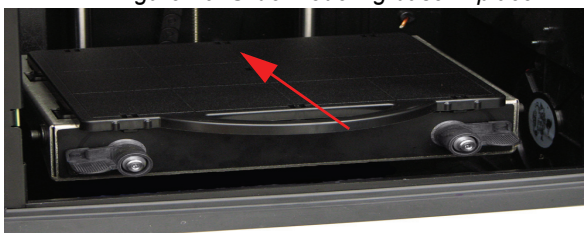
1. Make sure the two retainers are turned down so they do not interfere with modeling base installation.
2. Set the modeling base on the Z platform aligning the tabs on the modeling base with the slots on the metal tray. See Figure 9.

Figure 9: Z Platform Slots



3. Slide the modeling base down and toward the back of the unit until its front edge (with the handle) is flush with the front edge of the tray. See Figure 10.

Figure 10: Slide modeling base in place



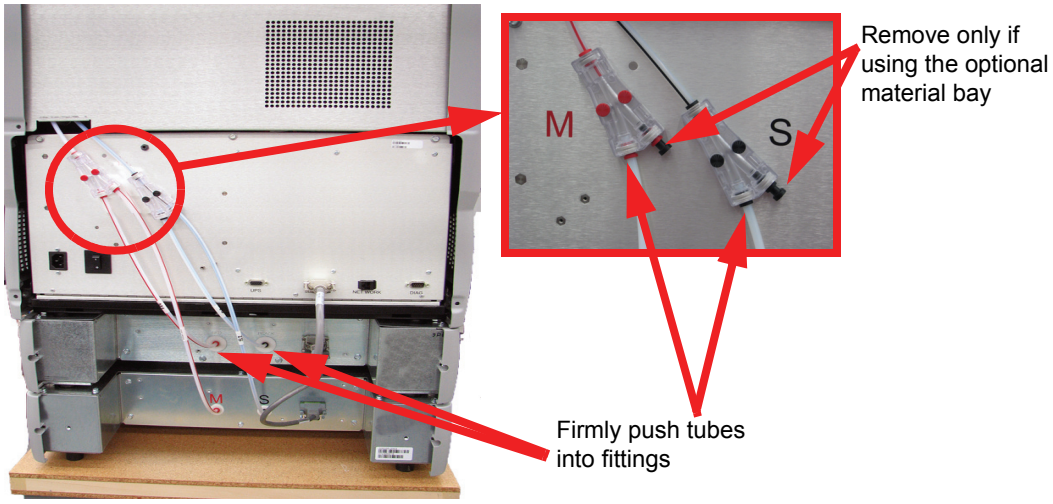
4. Secure the modeling base with the two retainers by turning them up. See Figure 11.

Figure 11: Turn retainers to lock modeling base in place.

Connecting the printer and material bay(s).

1. Connect the material tubes from the material bay(s) to the printer. The material tube with the red stripe is for the model material and the material tube with the black stripe is for support material. See Figure 12.

Figure 12: Material Tube connections



2. Connect the material bay communication cable(s) from the material bay(s) to the printer. Do NOT connect the material bay communication cable(s) while the printer is powered on. See Figure 13.

Figure 13: Material Bay Communication Cable

Note:

If you are using the optional second material bay, the longer material tubes are for the lower material bay and the shorter material tubes are for the upper material bay.

Power Cable

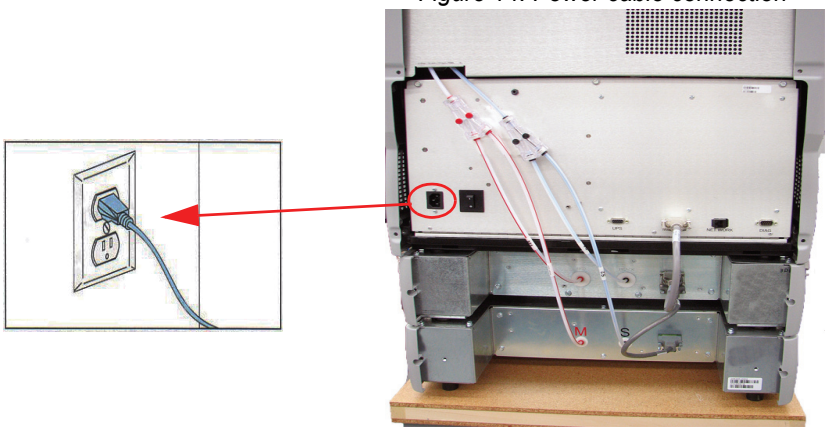
Connecting the power cable:

1. Connect the power cable to the back of the printer.
2. Connect the power cable to the dedicated power outlet. See Figure 14.

Note:

Do not use an extension cord or a power strip, using these can possibly cause intermittent power issues.

Figure 14: Power cable connection



Network/Crossover Connections

Connecting the network cable:

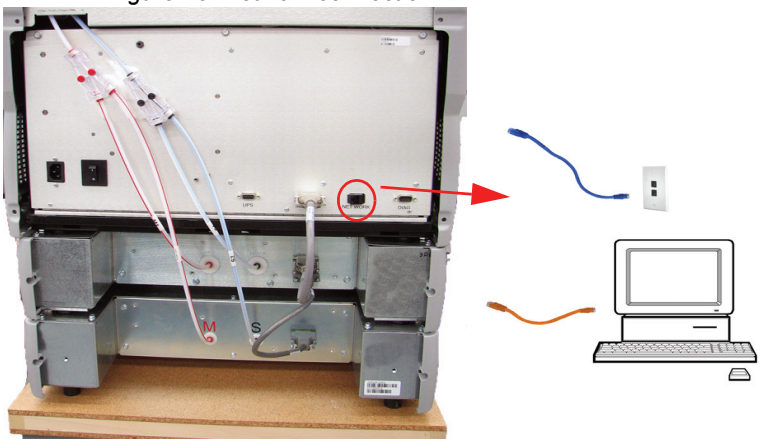
1. Connect the network cable (blue) to the network connection at the back of the printer.
2. Connect the network cable to the dedicated outlet or network hub.

If not using a network and connecting directly to a PC, you will need to use a crossover cable.

Connecting the crossover cable:

1. Connect the crossover cable (orange) to the network connection at the back of the printer.
2. Connect the crossover cable to the computer that will be sending the parts to the printer.

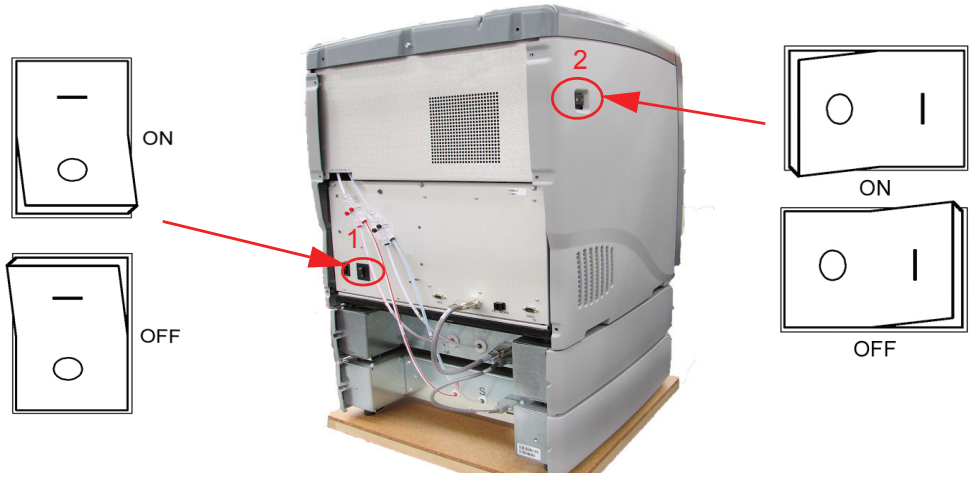
Figure 15: Network connection



Powering ON

The circuit breaker is located at the lower left corner on the rear of the printer. The power switch is located on the left panel towards the rear of the printer. After the power switch is turned on the printer will boot up within a few minutes. See Figure 16.

Figure 16: Circuit Breaker and Power Switch



Powering ON the printer:

1. Turn the circuit breaker to the ON position.
2. Turn the power switch to the ON position.

Note:

After powering the printer ON, it may take up to 5 minutes for the software to boot up completely.

Initial Language Setup

Upon first start up of the *uPrint* 3D printer, you will need to set your default language.

Setting your default language:

1. From the display panel press **Maintenance**.
2. Press **Setup**.
3. Press **Select Language**.
4. Select the default language you will be using and press the corresponding button.
   - English
   - Spanish
   - Italian
   - German
   - French
   - Chinese
   - Japanese
5. The display panel will ask **Are You Sure?** Press **Yes**.

Software

There are two software programs that work with *uPrint*. First there is CatalystEX which is the preprocessing software that controls the *uPrint* 3D printer. The second software program is the system software, which is factory installed on the printer. Because there are occasional changes to this software, you will have to verify that you have the latest version installed.

Installing CatalystEX:

1. Insert the CatalystEX installation CD into your CD-ROM drive of the computer that will be used.
2. Click the **Install** button. If autorun is enabled on your computer, this should come up in a pop up window after you insert the CatalystEX CD. If autorun is not enabled on your computer you will have to navigate to the CD-ROM directory and launch the setup application.
3. Follow the prompts to finish loading the CatalystEX software.

Note:

CatalystEX's installation setup allows you to change or confirm the target installation directory. To install CatalystEX in a directory other than the default, type the path and directory name in the dialogue box when prompted.

Verifying System Software:

1. Press **Maintenance** on the *uPrint* display panel.
2. The display will show the current version number and build number the printer has installed. Compare this build number to the build number that is on the CD from the start up kit. If the build numbers do not match, see "System Software" on page 29.

Networking Your Printer

There are two methods of connecting your printer to your computer, over a network and a direct connection to your PC. This section describes how to set up communication over a network. For instructions on setting up a direct PC connection, see "Connecting Directly To Your PC (if no network is available)" on page 27

You will need to establish communication between your PC and printer before you can send files to be built. How you establish this communication is dependent upon how your computer network is configured. In many cases, it is a simple matter of letting the CatalystEX software find your printer. In some situations you may need to set the network address for your printer and possibly record the IP address in the CatalystEX program.

Establishing communication on a Dynamic network:

If you are on a Dynamic network (or not sure of your network type) follow these steps to allow the CatalystEX software to 'find' your printer and establish communication.

1. Plug in the network patch cable from your network to the rear of the *uPrint* 3D Printer. (A network cable (blue) is included with the Start Up Kit.)
2. Make sure the printer is 'ON' and determine the Unique Device Name (UDN) for your printer.
   A. From **Idle** (or **Ready to Build)**, press **Maintenance** on the display panel. The display will show **Maintenance** and the software version.
   B. From the display panel press **System**.
   C. From the display panel press **Set Network**. The top window displays: **Network Admin - Dynamic IP Address; UDN**.

D. The UDN for your printer is listed here. This is preset at the factory and cannot be changed.

3. From your PC, start the CatalystEX application.

   A. From the General Tab, click the **Manage 3D Printers** button.

   B. Click the **Add from Network** button in the lower right corner of the pop-up window.

   C. A new pop-up, **Add 3D Printer**, should list your printer in the main window (identified by its UDN, or Unique Device Number). Click on the printer in this window and enter a Name and Location (Your choice) in the lower portion of the pop-up window.

   D. Click **Add Printer** and you are ready to print. Close the 3D Printer pop-up window.

Note:

If your printer is not displayed in the “Add 3D Printer” pop-up window, you are not using a Dynamic Network. You will need to set up a Static Network address.

Setting the Static Network address:

1. Obtain your static network address from your Network Administrator.
2. From **Idle** (or **Ready to Build**), press **Maintenance** on the display panel. The display will show **Maintenance** and the software version.
3. Press **System**.
4. Press **Set Network**. The top window displays: **Network Admin - Static IP Address**; **UDN**.
5. Press **Static IP** to display current settings. For example:

   IP Address: 192.000.000.001

   NM Address: 255.255.000.000

   GW Address: 198.000.000.001

Note:

These values are the factory defaults and must be changed for your network. If these values are not changed the printer will continue to restart itself until they are changed.

6. Look for the cursor beneath the first digit of the IP Address. The cursor does *not* blink. To update the **IP Address**:

   Press **Increment** to increase the value one digit at a time.

   Press **Next Digit** to move the cursor one place to the right.

   Press **Last Digit** to move the cursor one place to the left.
7. Use the three functions listed above to set your IP Address.
8. After setting the final digit of the IP Address, move the cursor one more place to the right. The cursor moves to the NM (or Netmask) address. Follow the same steps for setting the NM and GW addresses.
9. When you have finished setting the addresses, from the display panel press **Done**. The display will show: **Change IP, Netmask and Gateway?**
10. Press **Yes**. The panel then displays **Resetting Network** and after a moment returns to **Idle** or starts warming up.
11. From your PC, Start the CatalystEx application.

    A. From the General Tab, click the **Manage 3D Printers** button.

    B. Click the **Add from Network** button in the lower right corner of the pop-up window.

C. A new pop-up window, **Add 3D Printer**, should list your printer in the main window (identified by its UDN). Click on the printer in this window and enter a Name and Location (your choice) in the lower portion of the pop-up window.

D. Click **Add Printer** and you are ready to go. Close the 3D Printer pop-up window.

12. If your printer is not displayed in the **Add 3D Printer** pop-up window, you will need to add the printer IP address manually.

    A. From the General Tab, click the **Manage 3D Printers** button.

    B. Click the **Add Manually** button in the lower right corner of the pop-up window.

    C. In the pop-up window **Add 3D Printer**, enter a Name and Location (your choice) for your printer in the appropriate fields.

    D. Enter the IP Address for your printer in the appropriate field. It will be the same address as the one listed in step 4.

    E. Select the appropriate printer type from the drop down list.

    F. Click **Add Printer** and close the 3D Printer pop-up window.

13. If you are unable to connect the printer to your PC, contact your Network Administrator.

Connecting Directly To Your PC (if no network is available)

You can also connect the *uPrint* 3D printer directly to your PC without the use of a network. This is most easily accomplished with the printer in Dynamic Network mode (as received from the factory).

Connecting directly to the PC with a crossover cable:

1. Connect a crossover cable from your printer directly in to the network port on your PC. (A crossover cable (orange) is included with the Startup Kit)
2. Make sure the printer is “ON” and determine the Unique Device Name (UDN) for your printer.

    A. From **Idle** (or **Ready to Build**), from the display panel press **Maintenance**. The panel diplays **System Maintenance** and the Software version.

    B. Press the **System** button. The top window displays: **Network Admin - Dynamic IP Address; UDN**.

The UDN for your printer is displayed here. This is preset at the factory and cannot be changed.

3. From your PC, start the CatalystEX application.

    A. From the General Tab, click the “Manage 3D Printers” button.

    B. Click the “Add from Network...” button in the lower right corner of the pop-up window.

    C. A new pop-up window, “Add 3D Printer”, should list your printer in the main window (identified by its UDN). Click on the printer in this window and enter a Name and Location (your choice) in the lower portion of the pop-up window.

    Note:

    It may take up to 1 minute for your printer to appear in the pop-up window.

    D. Click “Add Printer” and you are ready to go. Close the “3D Printers” pop-up window.

4. If the printer does not appear in the pop-up window:

A. Close the **Add 3D Printer** pop-up window and click the **Add Manually** button in the **3D Printers** pop-up window.

B. in the pop-up window **Add 3D Printer**, enter a Name and Location (your choice) for your printer in the appropriate fields.

C. Enter the Dynamic IP Address for your printer (from Step 2B) in the appropriate field.

D. Select the appropriate printer type from the drop down list.

E. Click **Add Printer** and close the **3D Printer** pop-up window.

F. If you get an **"Error: Unable to connect to printer"** message it may be that your PC is not configured for Dynamic Networking. To configure your PC for Dynamic Networking:

   i. From the **Control Panel** of your PC, double click on **Network and Internet Connections**.

   ii. Double click on **Network Connections**, then double click on **Local Area Connection**.

   iii. Scroll the **Local Area Network Connection Properties** window to find the **Internet Protocol (TCP/IP)** selection. **Click on Internet Protocol (TCP/IP)** and then click on the **Properties** button.

   iv. From the **General** tab of the **Internet Protocol (TCP/IP)** properties pop-up window, click on the **Obtain IP Address Automatically** radio button.

   v. Click **OK** and then **OK** again.

   vi. After allowing your PC a minute or so to adjust to the new setting, your PC should connect to your printer.

   vii. If you are still unable to connect to your printer, recheck your connections and settings.

System Software

The system software is factory loaded on the printer. Due to occasional changes you may need to update the printer system software.

Updating System Software:

1. From the *uPrint* display panel, press **Maintenance**.
2. Press **System**.
3. Press **Load Upgrade**. The printer will then display **"Send upgrade from workstation"** followed by the printer's IP Address.
4. Open CatalystEX and click on the **Printer Services** tab.
5. Click on the **Update Software** button. CatalystEX will now connect to the printer and will prompt you to locate the upgrade file. Direct the software to the CD the upgrade file is on. The update will automatically be loaded on to the printer. After the update has been loaded, the display will show **Verifying update**.
6. When the verification has completed, the display will show **Reboot to complete**. Select **Yes**. The printer will now reboot and return to **Idle**.

Press the maintenance button and verify the updated version was installed correctly.

Installing a spool of material into the material carriers

An instructional video can be viewed at http://www.uPrintDimension.com

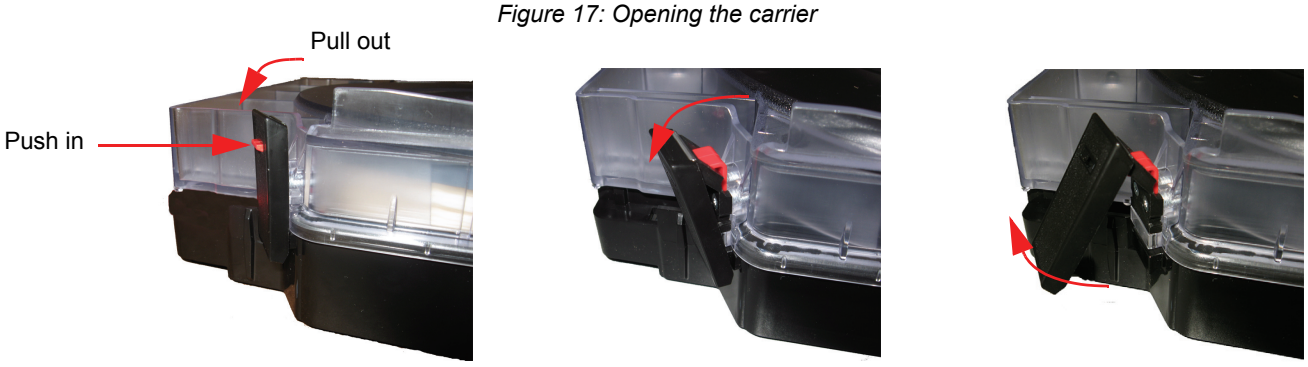
Installing a spool of material into the carrier:

1. For new carriers, remove the carrier from shipping box. Place on a flat surface, unlatch and open. See Figure 17.

Note:

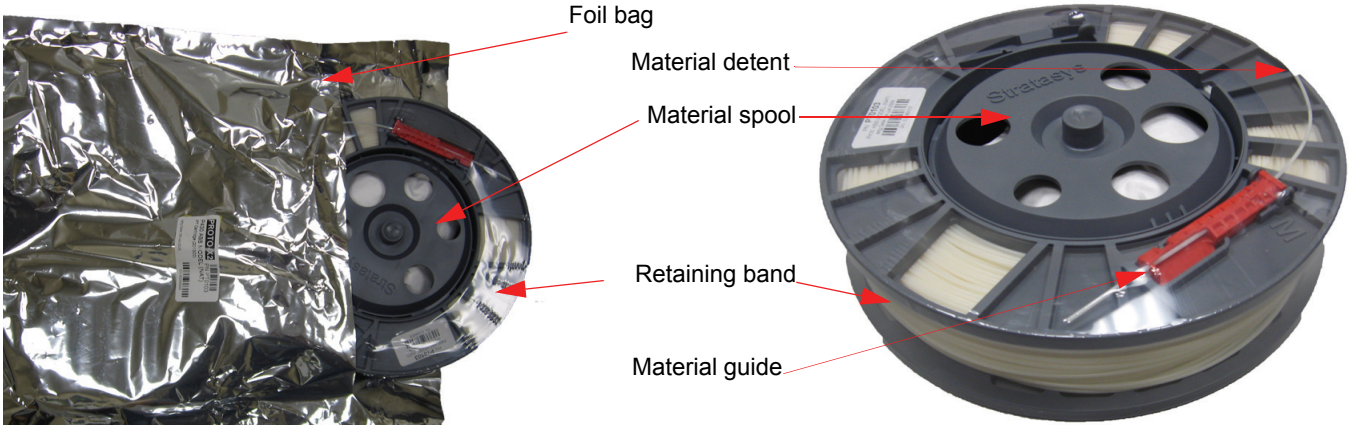
Save the enclosed storage bag for later use. The storage bag will be used to store material spools when they are not in use, and will help keep moisture out of the material.

Figure 17: Opening the carrier



2. Remove the material spool from the shipping box. Tear open the bag and discard (the bag will have a notch for tearing open). Note how the material and material guide are held in place under a clear material retaining band. See Figure 18.

Figure 18: Removing the material spool



3. Remove the material retaining band. Be sure to remove the entire retaining band. DO NOT remove the material guide from the spool at this time.
4. Place the spool in to the carrier with the material guide facing up.
5. Remove the material guide from the spool holding location.
6. Carefully remove material from the spool detent. See Figure 19 and Figure 20.

Figure 19: Place model material spool in to model material carrier

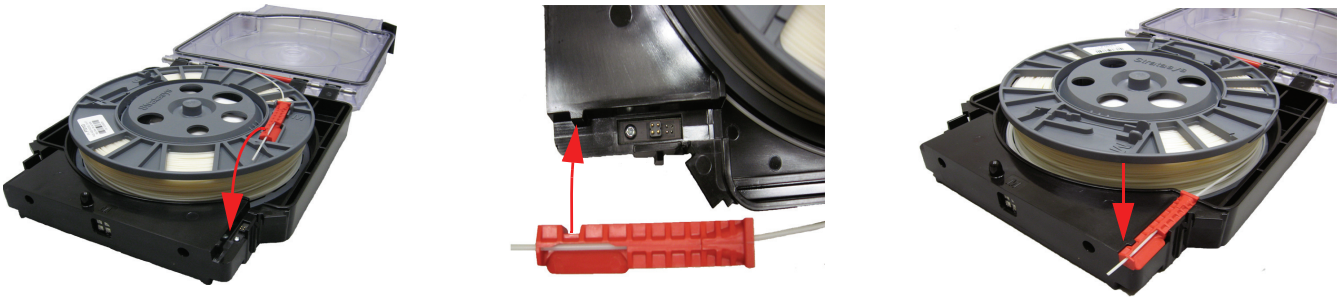
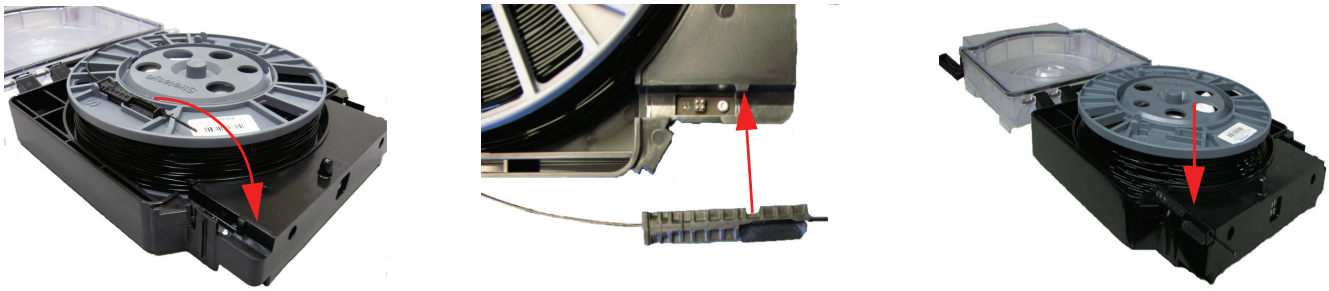


Figure 20: Place support material spool in to support material carrier



7. Place the model material guide into position see Figure 19 for model and Figure 20 for support.

Note:

Model and Support Carriers are different. The material guide tubes install on the opposite side. See Figure 19 and Figure 20.

8. Close the carrier with the material guide in place. Latch both buckles completely (the red tab must snap in to place on each buckle). See Figure 21.

Note:

Material must protrude at least 1mm (0.04 inch) but not more than 30mm (1.18 inch) from the end of the material guide.

Figure 21: Latching the Carrier

Adding material carriers to the single material bay

Once the carriers have been filled, you will need to add the carrier into the material bay.

An instructional video can be viewed at http://www.uPrintDimension.com

Adding material carriers to the material bay:

1. From the display panel press **Material**, the display will show **Add/Remove.**
2. Add the model and support carriers to the material bay by inserting the carriers into the material bays and latching into place.

Loading material to the head for the single material bay

1. Once the material carriers have been added to the material bays, press **Load...** next, press **Load Both**. The display will show **Loading Model**. After the model material has loaded to the head the display will show **Loading Support**.

   Note:

   It can take up to 5 minutes for the printer to load the material to the head.

2. When the printer has finished loading support material to the head, press **Done...** the display will show **Wait for Part** or **Ready to Build** (if a part is in the queue) and will also show the amount of material remaining in the model and support carriers.

Adding material carriers to the dual material bays

Once the carriers have been filled, you will need to add the carrier into the material bay.

An instructional video can be viewed at http://www.uPrintDimension.com

Adding material carriers to the material bays:

1. From the display panel press **Material**, the display will show **Add/Remove.**
2. Add the model material carriers to the M1 and M2 material bays by inserting the carriers into the material bays and latching into place.
3. Add the support material carriers to the S1 and S2 material bays by inserting the carriers into the material bays and latching into place.

Loading material to the head for the dual material bays

1. Once the material carriers have been added to the material bays, press **Load... Select Materials** will now be displayed.
2. Select the material bays that you want to be active, or loaded to the head. Select **Next Model** for the next model bay, this will toggle between M1 and M2, or **Next Support** for the next support bay, this will toggle between S1 and S2. A carrot will be placed next to the material bay that will be activated.
3. When the material bays have been selected, you can now press **Load Selected**. The display will show **Loading** and the model material bay that has been selected. After the model material has been loaded to the head, the display will show **Loading** and the support material bay that has been selected.
4. After the selected material bays have been loaded to the head, the display will show **Preparing** and the inactive model material bay. This will repeat for the inactive support material bay. An asterisk will be placed next to the model and support material bays that are active.

Note:

It can take up to 5 minutes for the printer to load the material to the head.

5. When the material has been loaded to the head and the secondary material bays have been prepared, press **Done...** the display will show **Wait for Part** or **Ready to Build** (if a part is in the queue) and will also show the amount of material remaining in both model and both support carriers.

Building a Test Part

Factory test parts have been pre-loaded into the operating system of your printer. To familiarize yourself with the system, it is recommended that you build one of these test parts before attempting to build one of your own files.

Once the printer has reached Idle, material has been loaded and a modeling base has been installed, you can build a test part with the printer.

1. From the display panel press **Maintenance**.
2. Press **System**.
3. Press **Test Parts** and select the sample wrench.
   - The printer will automatically start to print the test part.

When the part is finished, follow the steps under “Remove a completed part from the printer:” on page 40.

Operation

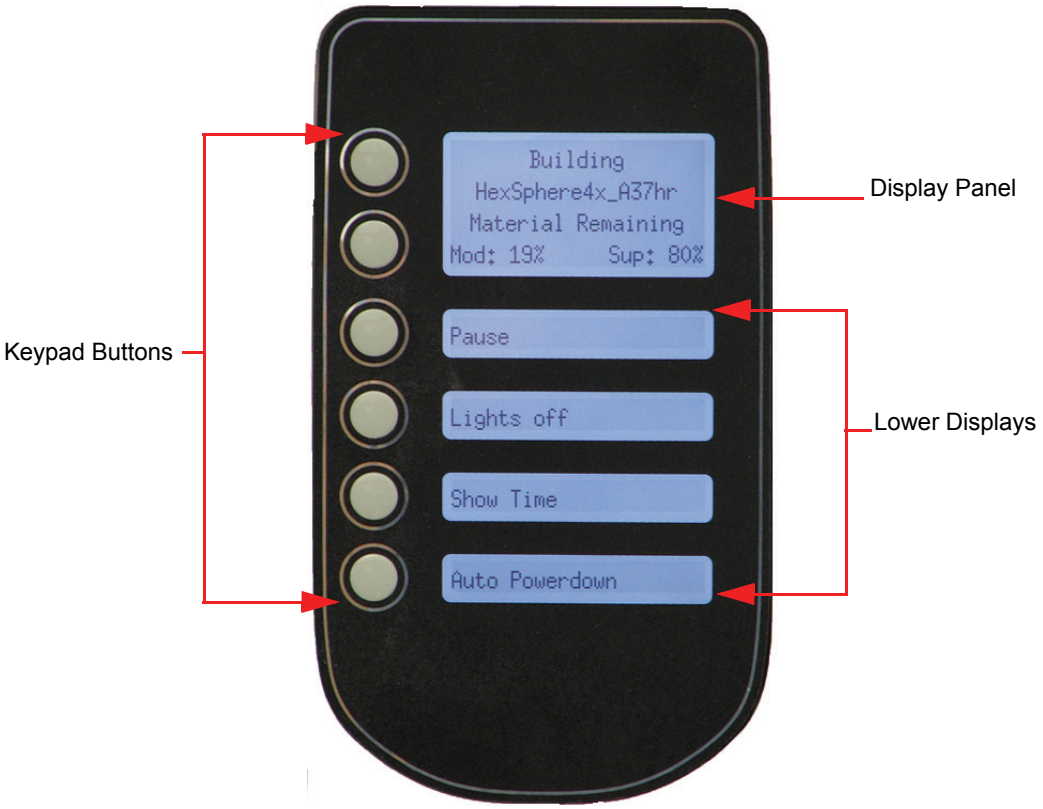
Powering On

Refer to “Powering ON the printer:” on page 24 for instructions.

Display Panel and Keypad

The main user interface to the *uPrint* 3D Printer is the Display Panel and Keypad. See Figure 22.

Figure 22: uPrint display panel and keypad



The *uPrint* display panel and keypad consist of a multiple-line LCD display on top, and four single-line displays, each with one button. The top line in the large display always shows the printer status. The display shows status information, menu’s and error codes.

Note:

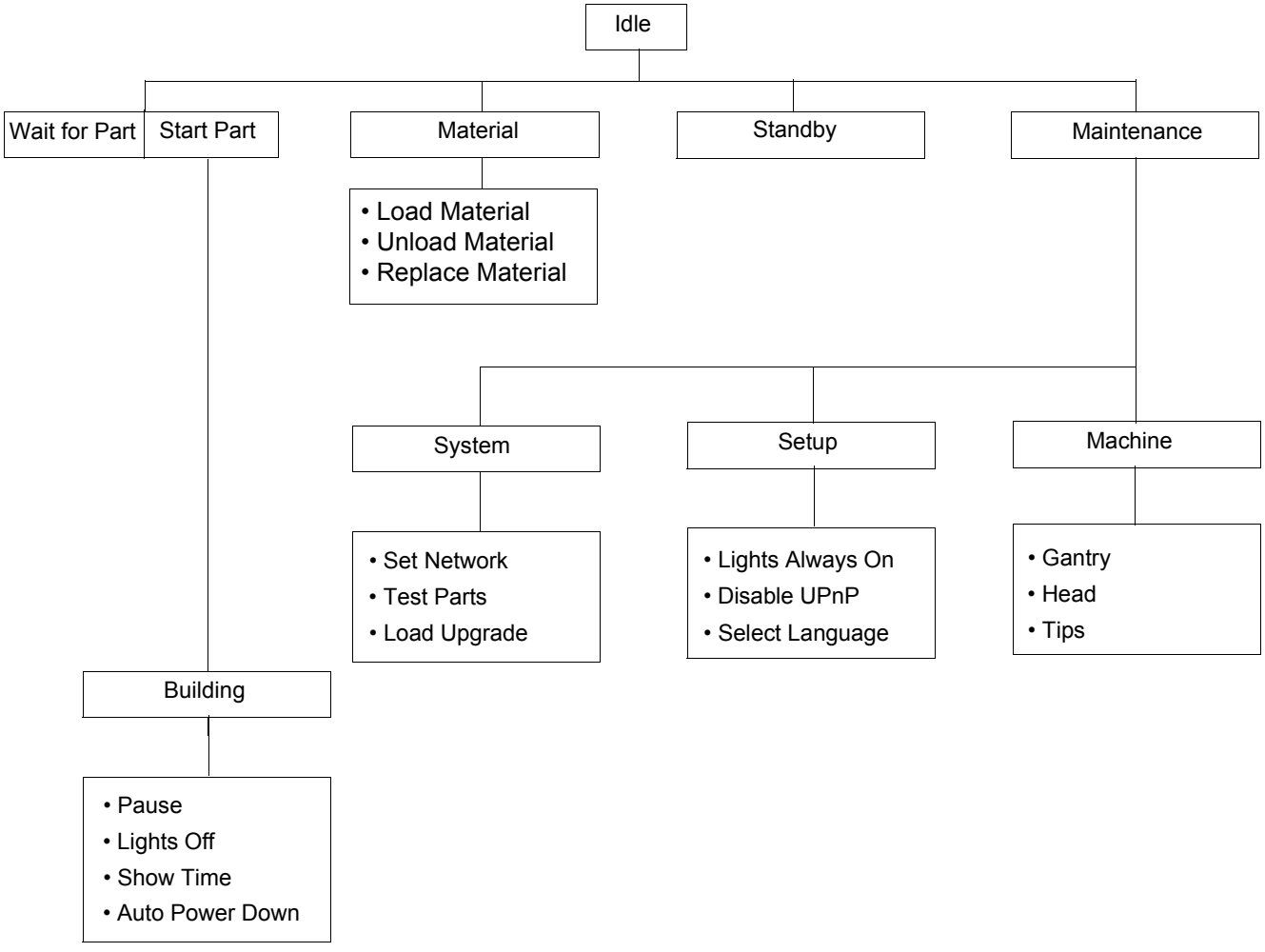
Occasionally there will be an item blinking in the lower displays. The blinking item is usually the next, most logical selection.

System Software Overview

This is a brief overview of the sections on the Display Panel.

- **Idle**: If there is no part being built and no part in the build queue, the display will show that the printer is **Idle**.
- **Wait for Part** or **Start Part**: If the printer is in Idle, you can set it to wait for a part. If the printer has a part in the build queue, you can press **Start Part** to start a build.
- **Building**: If the printer is building a part, you can choose to Pause, set the lights either ON or OFF, view the print time or material remaining and set the printer to auto power down.
- **Material**: From this section you can load material, unload material or replace material.
- **Standby**: From this section you can set the printer to Standby mode.
- **Maintenance**: From this section you can make changes to the **System**, **Setup** or **Machine**.

Figure 23: Display panel hierarchy

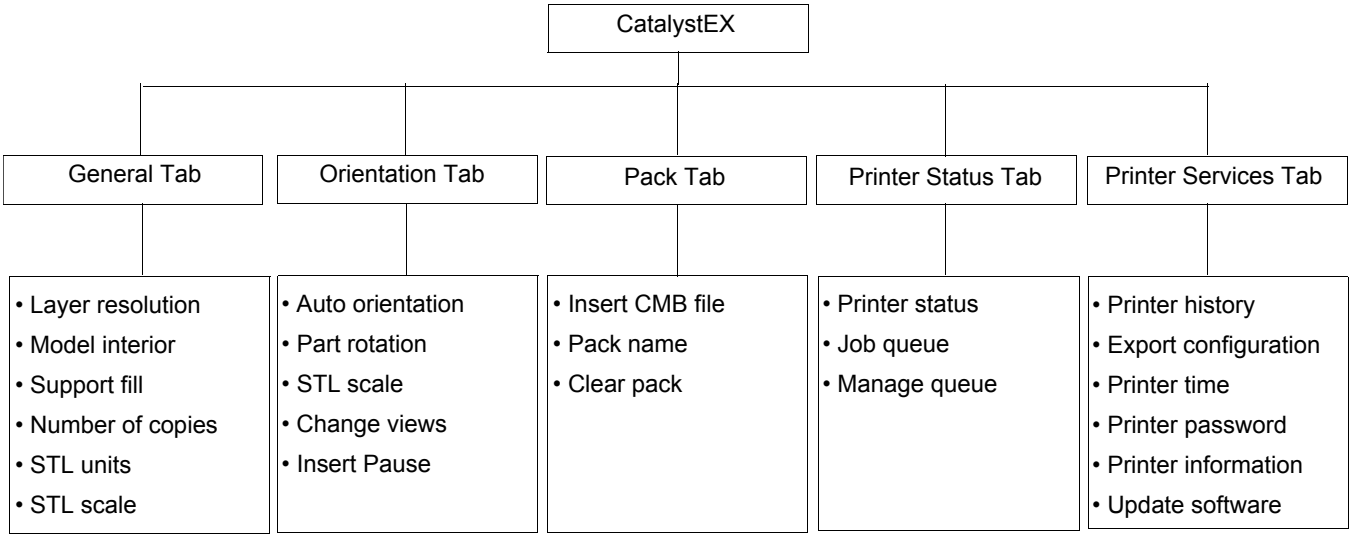


CatalystEX Overview

This is a brief overview of the sections in the CatalystEX software.

- General tab: This section is where you can select the type model fill and support fill. You can also change the STL units and STL scale in this section.
- Orientation tab: This section allows you to rotate and resize your parts. You can also change the view and auto orient your part or insert a pause.
- Pack tab: This section shows you which parts are in the pack for printing. You can add parts, move the parts around to make a better fit or clear the pack from this section.
- Printer Status tab: This section shows you the amount of material remaining for both model and support as well as which parts are in the Build Queue.
- Printer Services tab: From this section you can check the printer history, set the printer time, set the printer password, update printer software, get printer info and export configuration files.

Figure 24: CatalystEX hierarchy



Note:

For detailed information about the many file processing options available in CatalystEX, refer to CatalystEX Dynamic Help.

For more information about STL files, CMB files, part orientation, modeling envelope placement, print “job” efficiency and other print controls, refer to the CatalystEX Dynamic Help.

Setting up your STL file for printing

This section describes how to:

- Open your STL file with the CatalystEX software.
- Setting the scale and orientation of the part.
- Model material fill type.
- Support material fill types.
- Adding your part to the pack
- Printing your part.

Opening your STL file with CatalystEX:

1. Create an STL file using your CAD software. Refer to your CAD software help section for more information about converting your CAD drawing into STL files.
2. Open the CatalystEX software.
3. From the **File** menu select **Open STL...**
4. Navigate to and Select the STL file that you have created.

Setting the scale of your STL file:

Before you process a part for printing, you can change the size of the part within the build envelope. Every part has a pre-defined size within the STL file. After you have opened the file you can change the size of the part produced from the STL file by changing the scale. The scale always relates to the original STL file size definition.

For example: a cube that is defined as 2 X 2 X 2 can be built to be 4 X 4 X 4 by simply changing the scale to 2.0. If after changing the scale to 2.0, you decide that a size of 3 X 3 X 3 would be preferred, change the scale to 1.5 - the scale relates to the original size of 2.0, NOT the resulting 4.0 from the first scale change.

1. Click within the scale input box to type a scale of your choice.

Setting the orientation of your STL file:

The Orientation tab has an expanded model window. It provides options for viewing a part, measuring a part, orienting a part, processing a part and viewing the layers of a part. How a part is oriented in the modeling window will determine how the part is oriented when it prints on the modeling base.

Orientation impacts the build speed, part strength, surface finish and material consumption. Orientation can also affect the ability of CatalystEX to repair any problems with the STL file.

You can choose to Auto Orient your part, which allows CatalystEX to determine the best orientation for the part, or you can manually change the orientation of your part.

Orientation Considerations:

- **Build Speed** - Closely related to material use. In general terms, a lesser amount of supports will allow for a greater build speed.

  Another factor affecting build speed is the axis orientation. The printer can build faster across the X-Y plane than it can along the Z axis. Therefore, orienting a part so that it is shorter within the modeling envelope will produce a quicker build.

- **Part Strength** - A 3D part is stronger within a layer than it is across layers. Depending upon what you want your part to demonstrate, you may need to orient your part to have its greatest strength across a specific area. For example a tab that needs to be squeezed would be weakest if you are squeezing across layers.
- **Surface Finish** - Much like orienting for strength, orienting a part for surface finish will allow the printer to provide the smoothest finish for a specific area.
- **STL File Repair** - It is possible for an STL file to have errors while appearing to be trouble free. If the STL file contains errors, CatalystEX may have problems processing the file. CatalystEX has the ability to automatically correct some STL file errors. Part orientation can impact this automated repair function.

Selecting the model interior fill for your part:

This establishes the type of fill used for the interior, solid areas of the part. There are three types of model interior that you can choose from.

- **Solid** - Used when a stronger, more durable part is desired. Build times will be longer and more material will be used.
- **High Density Sparse** - This is the default model interior style and is highly recommended. Build times will shorter, less material will be used and the possibility of part curl for geometries with large mass will be greatly reduced.
- **Low Density Sparse** - The interior will be “honeycombed” or “hatched”. This style allows for the shortest build times and lowest material usage but will decrease the strength of the part.

Selecting the support material fill for your part:

Support material is used to brace the model material during the build process. It is removed when the part is complete. Support fill options will effect the support strength and build time of the print.

- **Basic** - May be used for most parts. It uses a consistent spacing between support raster toolpaths.
- **Sparse** - Minimizes the amount of support material. Sparse uses a much larger spacing between raster toolpaths than basic supports.
- **Minimal** - Used for small parts that have small features in need of supports. It is designed to make support removal easier on the small parts. DO NOT use minimal supports on large parts or parts with tall columns of support.
- **Surround** - The entire model is surrounded by support material. Typically used for tall, thin models.

Adding your STL file to the pack:

The **Add to Pack** button is found on the General tab, Orientation tab and Pack tab.

When you click on the **Add to Pack** button, CatalystEX will add the file that is currently in the model window (General tab or Orientation tab) to the pack preview window (Pack tab).

If the file in the model window has not been processed for print, processing will occur before the file is added to the pack. Each additional click will add another copy of the file to the pack.

Printing your STL file:

The **Print** button is found on the General tab, Orientation tab and Pack tab.

- If there is a pack currently open in the pack preview window, you will be prompted as to whether or not you want to clear the pack contents and then print the part or to add the part to the pack.

CatalystEX will now process all parts in the pack and create a CMB file from which the printer will print the pack.

Building a part

If a part has not been sent to your printer for building, the build queue will be empty. If the build queue is empty the display panel will show **Idle** or **Ready to build**.

Choose whether or not you want to start a build from a remote location or from the display panel at the printer.

Starting a build from a remote location:

The lower display will show **Wait for Part** and it will be flashing.

1. From the display panel press **Wait for Part**. The display will ask **Is Model Base Installed?**
2. Press **Yes**. **Waiting for Part** will now be on the display.
3. From your CatalystEX workstation, send a part to the printer. The printer will automatically start to build the model. See “Setting up your STL file for printing” on page 36 for detailed instructions.

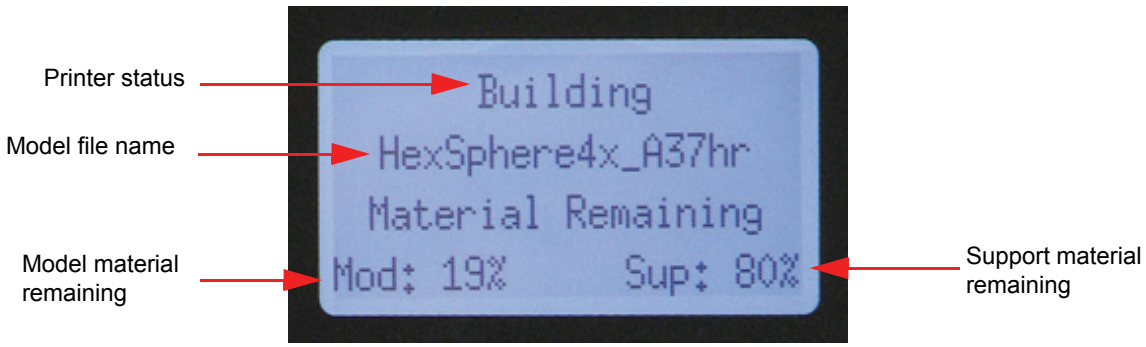
Starting a build from the display panel:

1. From your CatalystEX workstation, send a part to the printer. The display will show **Ready to Build** and the name of the first file that is in the queue waiting to be built.
2. From the display panel press **Start Model** to start building the model.

The display panel during build

The top two lines of the display panel will show the printer status. See Figure 25. The bottom line of the display panel will show the amount of model and support material that remains in the carriers.

Figure 25: Display panel during build



Note:

If a material amount is flashing, it indicates that the remaining material will not be enough to complete the current build.

Chamber Lights

When a part starts to build, the chamber lights are automatically ON. You can toggle the lights ON or OFF through the display panel.

You can also turn the light on permanently.

To set the chamber lights to always on:

1. From Idle or Ready to Build, on the display panel press **Maintenance**.
2. Press **Setup**.
3. Press **Lights Always On**.

Repeat this process to turn this option off.

Pausing a build

While building a part, you may want to pause the build to allow for material replacement. To pause the build at any time, from the display panel press **Pause**.

Note:

When the build process is paused, the printer completes the current tool path before pausing.

Resuming a build that has been paused

If you have pressed **Pause**, and are ready to resume building the part, press **Resume** and the printer will resume printing.

Canceling a build

You can cancel a build at any time while the part is building.

Cancel a build:

1. From the display panel press **Pause**.
2. Once the printer stops building, press **Cancel Build**.
3. The display will ask **Are you Sure?** Press **Yes**.
4. The display will show **Build Stopped** followed by the file name. You will then be prompted to remove the part and replace the modeling base.
5. Remove the part and replace the modeling base. Once the chamber door has been opened and closed, the display will ask **Part Removed?** Press **Yes** *ONLY* after you have removed the part and replaced the modeling base.

CAUTION

If you press Yes before removing the part, the printer can be damaged.

Removing a completed part

When the printer has completed building a part, the display will show **Completed** followed by the file name. It will also show **Remove Part** and **Replace Modeling Base**.

CAUTION

The modeling base will be hot, wear gloves when removing the part from the printer.

Remove a completed part from the printer:

1. Open the chamber door.
2. Turn the modeling base retainers down and remove the modeling base by sliding out and pulling up.
3. Insert a new modeling base by sliding in and pushing down, turn the retainers up to lock the modeling base in place.
4. Close the chamber door.
5. After you have opened and closed the door, the display will show **Part Removed?** *ONLY* after removing the part and replacing the modeling base, from the display panel press **Yes**.

CAUTION

If you press **Yes** before removing the part, the printer can be damaged.

- After you press **Yes**, the display will show the status as **Idle** or **Ready to Build** for the next part in the queue.

Remove a part from the modeling base:

1. After removing the modeling base from the printer, firmly flex the modeling base back and forth with your hands to loosen the part.
2. Pull the part off of the modeling base or use a putty knife to completely remove the part.

Note:

Parts are easier to remove from the modeling base when it is still warm.

Removing support material

uPrint uses soluble support material, designed to allow you to simply wash it away. Your part is left with a smooth and clean finish with the fine details intact. The soluble support material can be removed by hand with relative ease, but is designed to be dissolved from your parts for hands free finishing.

Warning:

Support material is sharp, wear safety glasses and gloves when removing support material.

Refer to the SST process guide for details regarding the removal of soluble support material. A copy of the SST Process Guide can be found at http://www.uPrintDimension.com

Emptying the purge bucket

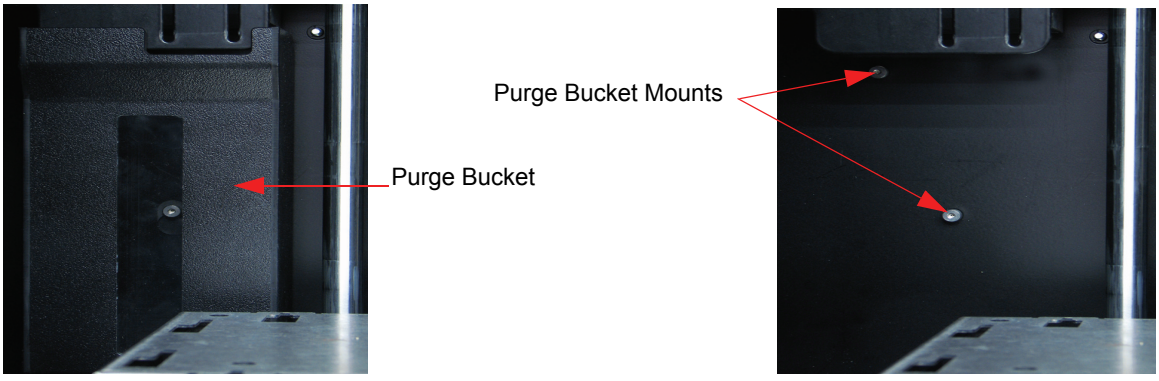
Empty the purge bucket after each build. This will ensure the purge bucket does not over fill which can cause part quality issues or damage to the printer.

WARNING

Wear gloves when emptying the purge bucket.

1. With a gloved hand, lift up on the purge bucket and pull it off of the 2 mounts. See Figure 26

Figure 26: Emptying the purge bucket



2. Empty the purge bucket.
3. Place the purge bucket over the 2 mounts and push down to lock in place.

CAUTION

When reinstalling the purge bucket, make sure that it locks on both mounts and hangs flush with the chamber wall to avoid damage.

Replacing material for single material bay

Removing material from the printer:

1. From the display panel press **Material...** The display will show **Add/Remove** and **S1(remaining%)** and **M1(remaining%)**. Asterisks will mark the currently active material bays (the material bays that are currently loaded to the head).
2. Press **Unload...**
3. Press **Unload both**, **Unload Model** or **Unload Support**, depending on which you need to replace.
4. The printer will now unload material from the head. When the material has unloaded, you will need to replace the material carriers.
5. Once the material carriers have been replaced press **Load...**
6. Press **Load Model, Load Support** or **Load both** depending on which material you are replacing.
7. After material has been loaded to the head press **Done...** the display will show **Wait for Part** or **Ready to Build** (if a part is in the queue) and will also show the amount of material remaining in the model and support carriers.

Replacing material for dual material bays

Removing material from the printer:

1. From the display panel press **Material...** The display will show **Add/Remove** and **S1%, S2**(remaining%) and **M1, M2** (remaining%). Asterisks will mark the currently active material bays (the material bays that are currently loaded to the head).
2. Press **Unload...**
3. Press **Unload both**, **Unload Model** or **Unload Support**, depending on which you need to replace.
4. The printer will now unload material from the head. When the material has unloaded, you will need to replace the material carriers.
5. Once the material carriers have been replaced press **Load...**
6. You can change which carriers you want to load at this time by selecting **Next Model** or **Next Support**. When done selecting which material bays will be loaded, press **Load Selected**.
7. The printer will now load the selected material bays and prepare the other bays for automatic loading. After they are done loading and preparing, press **Done...** the display will show **Wait for Part** or **Ready to Build** (if a part is in the queue) and will also show the amount of material remaining in the model and support carriers.

Dual material bay LED's

When using the optional second material bay, the LED's on the material bay will become active. The table below will show the status indicated by the LED's.

On ●	Material currently loaded to the head
Off ○	No carrier present Carrier present and ready to be loaded
Blinking ☼	Carrier needs replacement (is empty or has an error)

Replacing material spools

Removing a spool of material from the carrier:

1. Place the carrier on a flat stable surface.
2. Unlatch the carrier and open.
3. Remove the spool of material. **Discard any pieces of material that may remain in the carrier.**
4. Remove the material guide and recycle. See "Removing the EEproms from the material guides" on page 67
5. Recycle the empty material spool. See "Recycling" on page 66

Installing a spool of material in to the carrier:

1. See "Installing a spool of material into the carrier:" on page 29.

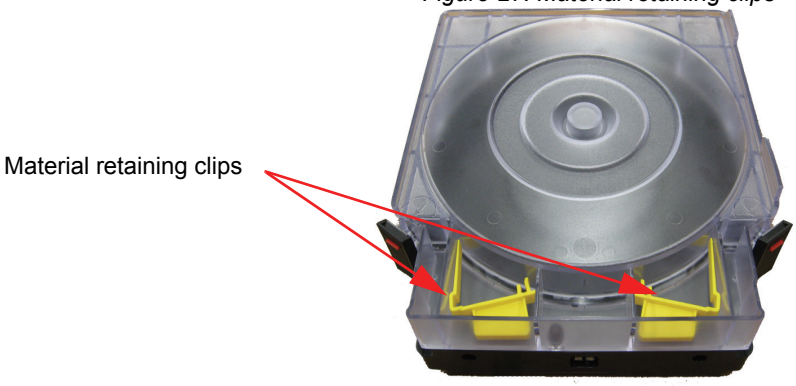
When the printer has finished loading material the display will show Idle or Ready to Build (if a part is in the queue) and will also show the amount of material remaining in both model and support carriers.

Storing material

In the event you power down the printer for more than a few days, you will want to unload the material and place it inside the storage bag that came with the material carrier.

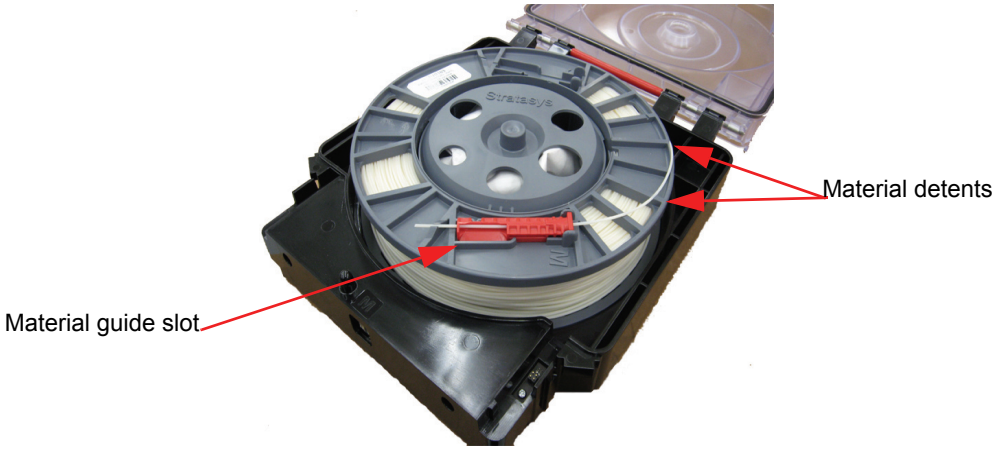
1. Unload material from the printer.
2. Locate your 2 material retaining clips on the carrier. See Figure 27.

Figure 27: Material retaining clips



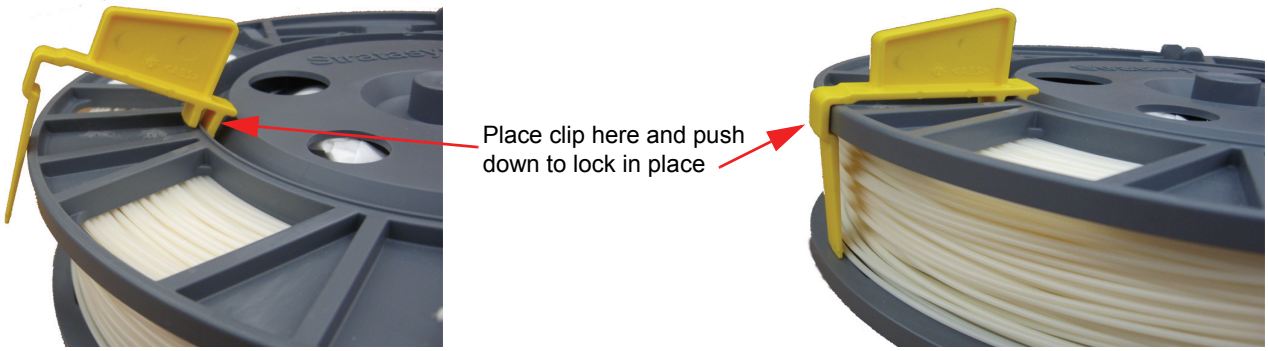
3. Place the material guide in the material guide slot on the spool. See Figure 28.
4. Place the material in the material detents. See Figure 28.

Figure 28: Material guide slot and detents



5. Cut the excess material from material guide.
6. Place the material retaining clips on the spool before removing the spool from the carrier. See Figure 29.
   A. Push the material retaining clips over the material and clip on to the material spool.
   B. Push the material retaining clips down until they lock in place.

Figure 29: Installing material retaining clips



7. Remove the material spool from the material carrier. See Figure 30.

Figure 30: Properly installed material retaining clips.

8. Place the material spool in the bag that came with the material carrier.

Auto power down

You can set the printer to automatically power down when it completes a build. This option will save energy usage.

Setting up auto power down:

1. While the printer is building, press the **Auto Power Down** button.
2. Turn the power switch to the off position.

The printer will display **Auto Power Down Mode** and the printer will power down as soon as the build is complete.

Cancelling auto power down:

1. Turn the power switch back to the ON position.

Powering off

To power off the printer, turn the power switch to the OFF position. See “Powering ON the printer:” on page 24 for instructions. You can do this at anytime without harming the printer. No other steps are necessary. If this is done while the printer is building a part, the current part will not be completed.

Note:

System cooling fans and lights will continue to operate for several minutes after the switch has been turned off.

Resuming operations from Standby mode

After several minutes of inactivity, the printer will enter Standby mode. During Standby, the head temperature will decrease to conserve energy.

Continue operation from Standby mode:

1. From the display panel press **Resume**

Preventive Maintenance

Daily

Empty the purge bucket

Empty the purge bucket after each build has completed. See “Empty the Purge Bucket” on page 36. for instructions.

Inspect the tip wipe assembly

After each build you should inspect the tip wipe assembly to make sure there is no material build up. If there is material build up, remove it. Material build up on the tip wipe assembly can cause part quality issues.

Inspect the tip shields

After each build you should inspect the tip shields for damage or material build up. If there is material build up remove it as needed. If the material will not break free or there is damage to the tip shield, replace the tip shield.

500 Hour maintenance

Replace the tip wipe assembly

At 500 hours it will be necessary to replace the tip wipe assembly. To replace the tip wipe assembly See “Replacing the tip wipe assembly:” on page 56.

Replace the tip shields

At 500 hours it will be necessary to replace the tip shields. To replace the tip shields See “Tip Shield Replacement” on page 57.

2000 Hour maintenance

Tip replacement

At 2000 hours, it will be necessary to change the tips. See “Extrusion Tip Replacement and Calibration” on page 59.

Troubleshooting and Maintenance

Troubleshooting Checklist

Problem or error message on display panel	Solution
No power	Verify power cord is securely plugged in.
	Verify that the circuit breaker (at rear of system) and the power switch (on left side panel of system) are both in the ON position.
	Verify AC power is present at wall outlet.
System fails to reach operating temperatures	Verify the system is not connected to an extension cord or power strip.
Material not extruding	Material may be jammed in extrusion head see “Clogged Extrusion Tip” on page 51.
Purge material accumulating on part.	Make sure that the flicker and brush are set to the proper height. See “Replacing the tip wipe assembly:” on page 56
	Check condition of Flicker and Brush. Replace if worn. See “Replacing the tip wipe assembly:” on page 56.
No text displayed on Display Panel	Cycle power. see “Cycling Power” on page 55.
Cannot communicate with system through network	Make sure network cables are connected - at the printer, at the PC, and where cables connect to network boxes.
	Re-configure settings, see “Networking Your Printer” on page 25.
	If using a Static network address, verify that the IP address entered in CatalystEX has the same value as the address entered for the printer.
	Your system configuration may have changed. Contact your Network Administrator.
Error Code displayed on Display Panel	Contact Technical Support. For more information, refer to“Fault Determination Codes” on page 49

Problem or error message on display panel	**Solution**
Build Error	Partial or bad part file sent to system. Check STL file validity in CAD software; reprocess STL in Catalyst and redownload to system.
Can't Find Home – Check Modeling Base	Verify a modeling base is inserted.
	Modeling base may be used or defective – replace.
Material Error Filament error Remove Carrier Check Filament	Remove the carrier and verify material is coming out of the material guide.
	Verify material pulls freely from the carrier.
	Reload material.
Material Error Filament blocked Remove Carrier Clear filament path	Remove carrier and verify material pulls freely from carrier.
	Verify the material tubes are free of material.
	Reload material.
Material Error Carrier invalid Remove carrier	Remove carrier and verify it is not empty.
	Replace material spool.
Material Error Filament broken Remove carrier Clear filament path	Remove the carrier and verify material is coming out of the material guide.
	Verify material pulls freely from the carrier.
	Verify the material tubes are free of material.
Material Error Carrier invalid Remove carrier Clear filament path	Remove carrier and clear material tubes.
	Replace material spool.
Load Error Filament error Remove carrier Clear filament path	Remove the carrier and verify material is coming out of the material guide.
	Verify material pulls freely from the carrier.
	Verify the material tubes are free of material.
Load Error Filament blocked Remove carrier Clear filament path	Remove the carrier and verify material is coming out of the material guide.
	Verify the material pulls freely from the carrier.
	Verify the material tubes are free of material.

Problem or error message on display panel	**Solution**
Load Error Purge failed Remove carrier Clear filament path	Remove the carrier and verify material is coming out of the material guide.
	Verify the material pulls freely from the carrier.
	Verify the material tubes are free of material.
	Check for and clear any excess material build up around the tips.
Unload Error Unload failed Remove carrier Clear filament path	Remove the carrier and verify the material tubes are free of material.

Fault Determination Codes

If a fault occurs which would prevent *uPrint* from executing an operator request, the system will begin to shut down and cool. The panel will display one or two error codes. An error-code list (with the filename “error.txt”) can be found on the CD-ROM for the system software. (Because this list may change with each new software version, be sure to check the error.txt attachment when you download new software upgrades.)

After the printer has finished cooling, the only option displayed is **Continue**. Press **Continue** and the printer will reboot and try to return to normal operation. If pressing **Continue** does not recover the printer, power should be cycled (see “Cycling Power” on page 55.); wait 60 seconds before switching power on again. In most cases you will be able to continue operation. However, if the printer continues to shut down and display the same error, contact technical support.

Welcome Kit Tools

The *uPrint* Welcome Kit contains replacement parts and a set of tools used to help you maintain the system.The following is a list of the tools contained in the Startup Kit.

- Needle Nose Pliers
- T-Handled Wrench - 1/8 inch
- T-Handled Wrench - 7/64 inch
- Gloves (Pair)
- Cutters
- Brush
- Magnifier

Diagnosing Loss of Extrusion

Occasionally, the printer's head may experience loss of extrusion. This will be evident by observing one of the following:

- Seeing the head moving with no material coming out of either extrusion tip
- The height of the model and support materials are not equal
- Sagging structures due to lack of support materials

WARNING

The head area is hot. Use gloves when working in this area of printer.

Diagnose loss of extrusion:

1. From the display panel press **Cancel** and remove any parts from the printer.
2. Insert a new modeling base.
3. From **Idle**, press **Maintenance**
   A. Press **Machine**.
   B. Press **Head**. The head will come to rest in the center of the chamber and the Z Platform will change position.

The display will read: **Model Drive Motor Stopped**

4. Determine if there is a model material extrusion problem by pressing **Forward** (command will be available after Head reaches operating temperature). Watch the model tip (right tip) for several seconds, looking for extrusion (material purge).

Note:

If it was previously at a cool temperature, the tip may not immediately extrude material. After the tip reaches operating temperature you may need to wait up to 30 seconds before extrusion will begin.

5. Press **Stop** to stop the extrusion.
6. If material steadily flowed from the model tip, the model tip is not experiencing loss of extrusion.
7. Test the support material tip by choosing: **Select Drive -** the display will read:
8. Determine if there is a support material extrusion problem by pressing **Forward**. Watch the support tip (left tip) for several seconds, looking for extrusion (material purge).
9. Press **Stop** to stop the extrusion.
10. If material steadily flowed from the support tip, the support tip is not experiencing loss of extrusion.
11. Return the printer to the Maintenance state - Press **Done,** then press **Yes** when the printer displays **Is Material Loaded?**

Note:

If material did not extrude from either tip follow the procedure in the following section, “Recovering From Loss of Extrusion” on page 53.

Clogged Extrusion Tip

Occasionally, an extrusion tip may clog with material. This is often accompanied by a Loss of Extrusion (LOE). A clogged Tip will prohibit material load.

Clearing a clogged extrusion tip:

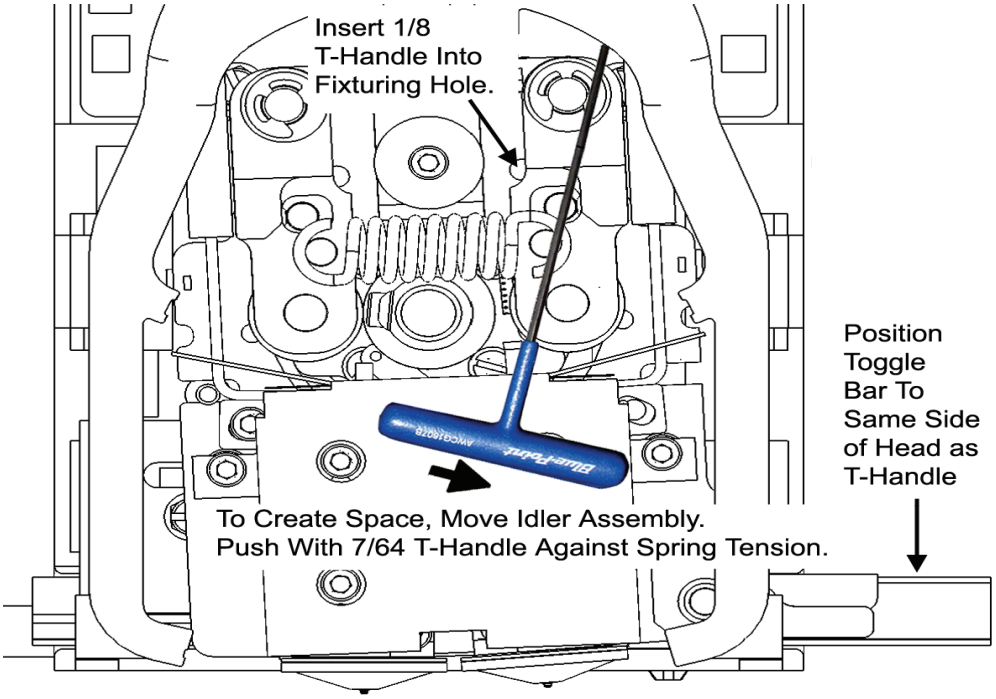
Note:

It is recommended that you read and understand this entire procedure before performing any of the work.

This procedure assumes that material is loaded to the extrusion tip. If material has not been loaded, see “Adding material carriers to the material bay:” on page 31.

1. From the display panel press **Maintenance**.
2. Press **Machine**.
3. Press **Head**.
4. Remove the Head Cover and the Air Plenum. Move the material idler wheel out of the way on the side that is clogged. Use a 7/64 and 1/8 T-Handle as illustrated in Figure 32 (model side shown).

Figure 31: Create access space for cleaning - model side shown



5. Move the toggle bar to ‘deactivate’ the clogged tip.

Note:

Push the toggle bar to the right to deactivate the support side.
Push the toggle bar to the left to deactivate the model side.

6. Snip the material just after the it passes between the material drive and the idler wheel (‘pinch point’).

Note:

If necessary manually pull more material forward in order to reach the ‘pinch point’.

7. Move the toggle bar to activate the clogged side. This will make the drive wheel control options active for the clogged side.

Note:

Push the toggle bar to the left to activate the support side; push the toggle bar to the right to activate the model side.

8. Press **Forward** on the interface panel. The drive wheel will turn, but material will not feed because the idler wheel is held out of position.
9. Use the 7/64 T-Handle to hold pressure against the toggle spring and keep the idler wheel away from the material. Remove the 1/8 T-Handle.
10. Press **Blower Off** on the interface panel. With the head blower off the temperature of the extrusion tube will increase.

11. After approximately 5 seconds, reduce pressure against the toggle spring and allow the idler wheel to contact the material. Material should extrude from the clogged tip.

Note:

The blower will automatically turn on in 10 seconds.

12. Press **Stop** on the interface panel.
13. Move the toggle bar to activate the drive wheel control options for the non-clogged side.
14. Press **Forward** on the interface panel. Make sure that material extrudes from the non-clogged extrusion tip.

Note:

It is necessary to confirm proper operation of the non-clogged side. Temporarily having the blower off can occasionally cause the non-clogged side to clog.

15. Press **Stop** on the interface panel.
16. Install plastic head cover.
17. Exit Maintenance mode.

Recovering From Loss of Extrusion

Note:

It is recommended that you read and understand this entire procedure before performing any of the work.

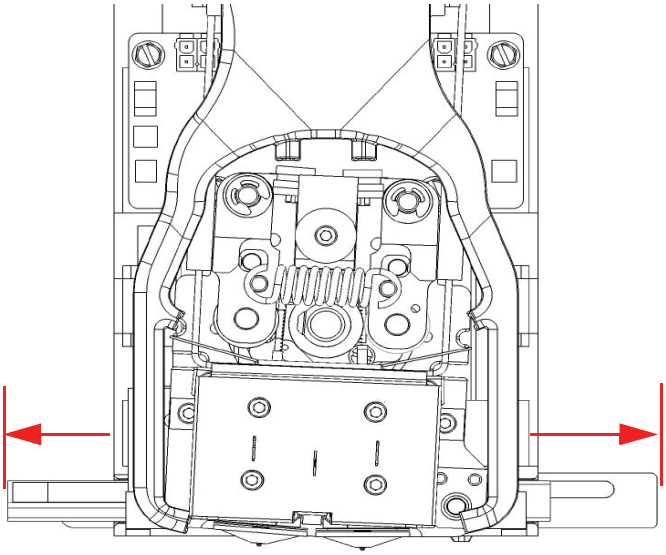
1. Enter **Head Maintenance** mode.
   A. From **Idle**, press **Maintenance**.
   B. Press **Next**.
   C. Press **Head Maintenance**.

WARNING

The head area is hot. Use leather gloves when working in this area of printer.

2. Remove plastic head cover.
   - Remove plastic head cover by squeezing raised pads on sides of cover. See Figure 38.
3. Place the tip toggle bar in neutral position (bar will extend equally from both sides of head). This can be done manually - push on the extended bar end.

Figure 32: Tip Toggle Bar in Neutral Position



CAUTION

The end of the extrusion tip where the material enters is called the Extrusion Tube. Extrusion Tubes are fragile. Use care when working in this area so as to avoid damage to the tubes.

4. Remove excess material found around the head area.

Note:

Material fed to the tip can sometimes jam causing a build-up of material under the head cover.

A. Clean out as much of the material as possible using needle nose pliers, a probe, or equivalent tool.

B. To facilitate access to areas that may need to be cleaned, move the material idler wheels out of the way (there is one idler wheel for support material and one for model material illustrates the model side):

Note:

Move only one idler wheel assembly at a time. Finish cleaning around the moved wheel and restore it to its normal position before moving the other idler wheel. Having both wheels out of position simultaneously could stretch the spring.

i. Using a 7/64 T-handled hex driver (from Start-Up Kit) to leverage against the lower idler wheel shaft, push the idler assembly away from the Material drive gear by pushing against the spring tension. See Figure 31.

Note:

When moving the idler wheel assembly, you can obtain maximum clearance for cleaning if you also move the Tip Toggle Bar so that it is extended to the same side of the head assembly as the one on which you are working. It is not necessary to keep Toggle Bar in a neutral position.

ii. Insert 1/8 T-handled hex driver (from Start-Up Kit) into the fixture hole.

iii. Ease pressure on the 7/64 T-handle driver to carefully return the leveraged idler wheel back toward its original position - until the idler assembly is resting against the 1/8 T-handled hex driver.

iv. Remove the 7/64 T-handled driver used to leverage the idler assembly.

v. Clean the area that is now accessible. Remove the 1/8 T-handle hex driver when complete.

6. Remove excess material from the top of the liquefier.
   - Use needle nose pliers to carefully grip and remove excess material from the top of the liquefier.
7. Snip the material line from the cartridge close to the drive wheel.
8. Make sure that all loose material is removed from the affected extrusion inlet area.
9. Check for loose material in the other extrusion inlet area. Clean the area as necessary.

Cycling Power

To cycle power to the printer:

1. Turn the power switch to the OFF position. The display will show **Shutting Down**.
2. After the printer has cooled down enough to shut down, the display will go blank.
3. When the display is blank and the printer has shut down, turn the circuit breaker to the OFF position.
4. Once the circuit breaker has been turned to the OFF position, wait 30 seconds and turn the circuit breaker back to the ON position.
5. Turn the power switch to the ON position. The printer display will show that it is starting up.

Once the display shows **Idle** or **Ready to Print**, you can send a file to the printer to be printed.

Tip Wipe Assembly

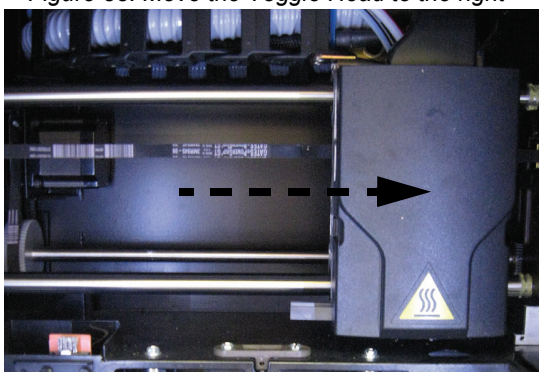
The tip wipe assembly should be replaced approximately every 500 hours.

Replacing the tip wipe assembly:

(Refer to.

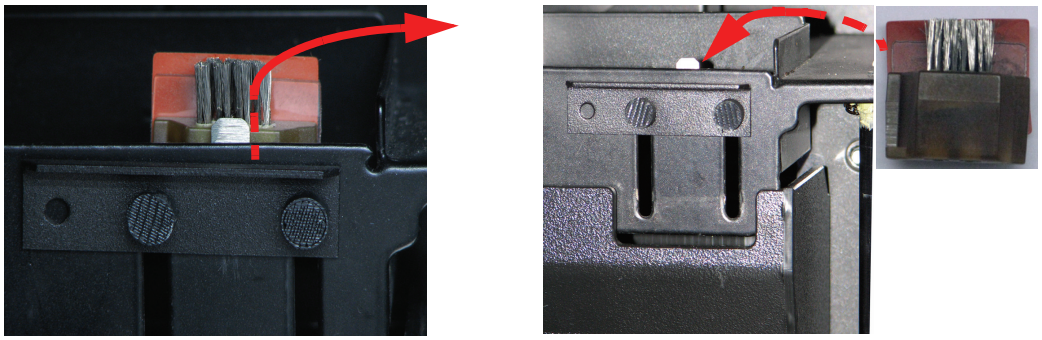
1. Completely power down the printer. See “Powering off” on page 45.
2. Move the Toggle Head to the right of the printer to gain access to the tip wipe assembly.

Figure 33: Move the Toggle Head to the right



3. Remove the tip wipe assembly by lifting the assembly up and out of the printer. Discard this tip wipe assembly.

Figure 34: Replacing the tip wipe assembly

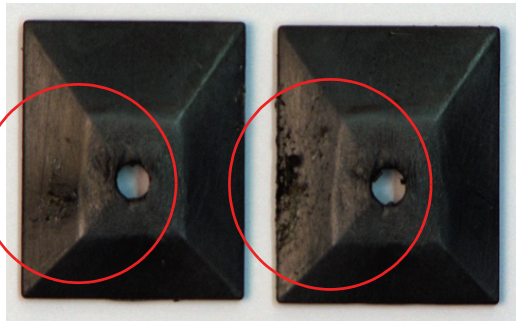


4. Place the new tip wipe assembly over the two mounting posts making sure the assembly is fully seated.

Tip Shield Replacement

Tip shields can become worn or damaged over time. This can have a negative impact on the surface finish and detail of models. Replace the tip shields every 500 hours.

Figure 35: Tip Shield Damage



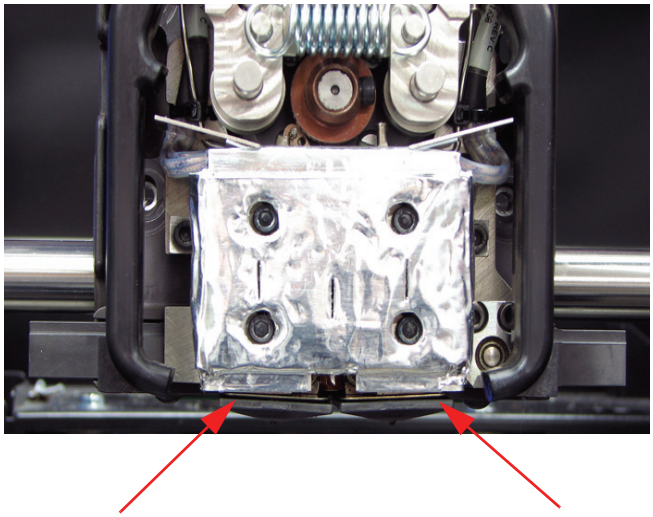
1. Enter **Head Maintenance**.
   A. From the display panel press **Maintenance**.
   B. Press **Machine**.
   C. Press **Head**. The head will come to rest in the center of the chamber and the Z Platform will change position.

WARNING

The head area is hot. Use gloves when working in this area of printer.

2. Position the blade of the small screwdriver between the Tip Shield and Tip Plate.
3. Use the blade of the small screwdriver to separate the Tip Shield from the Tip Plate. See Figure 36

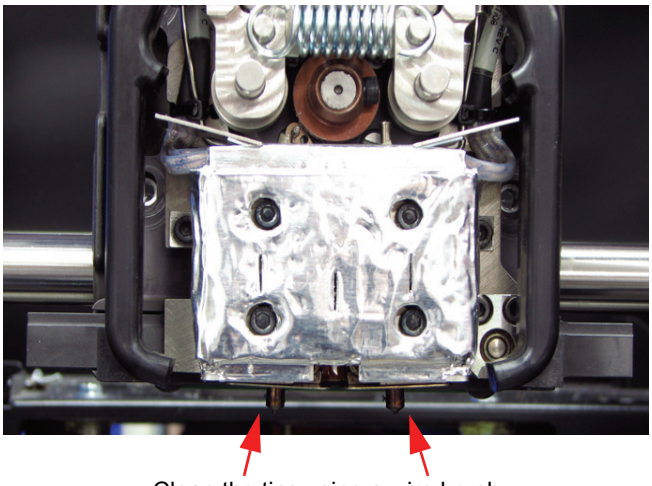
Figure 36: Tip Shield Removal



Insert small standard screwdriver to pry tip shields from tips.

4. Clean the tip using the wire brush supplied with the Start Up Kit to remove any debris. See Figure 37

Figure 37: Clean tips with wire brush



Clean the tips using a wire brush.

5. Install a new Tip Shield by pushing it, by hand, over the exposed tip, keeping the slotted end towards the back of the tip.
6. Exit **Maintenance**.

Extrusion Tip Replacement and Calibration

Replace Tips at approximately 2000 hours.

Note:

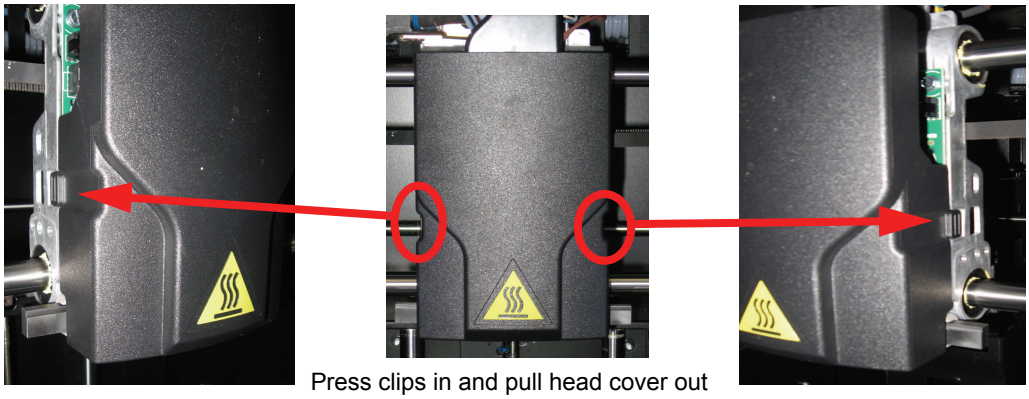
Tips can also be damaged by improper care while performing maintenance in the area around the tips.

CatalystEX displays the tip time (hrs) - from the Printer Services Tab - Printer Info button (Tip time will reset to zero after replacement).

Removing Tips:

1. You will need to make sure the printer is powered ON before replacing the extrusion tips.
2. From the display panel press **Maintenance**.
3. Press **Machine**.
4. Press **Tip**.
5. The printer will display **Load Model - Unloading**.
6. After the temperature has stabilized, the printer will display **Tip Maintenance - Replace Tips**. You can now open the printer door and replace the tips - or you can **Cancel** the tip replacement procedure.
7. Remove plastic head cover by squeezing raised pads on sides of cover.

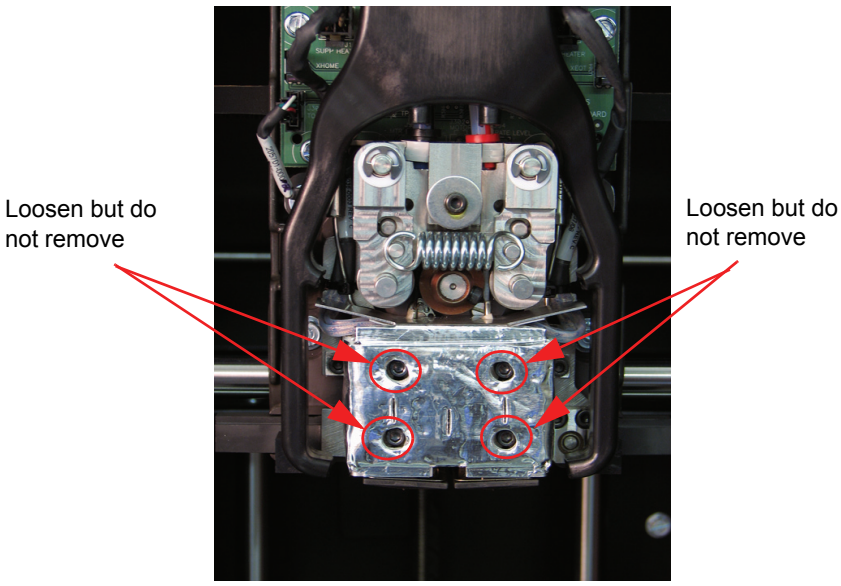
Figure 38: Removing the Head Cover



Press clips in and pull head cover out

8. Remove Tips
   A. Use 7/64 T-Handle Allen wrench to loosen the tip screws three to four full turns counterclockwise - or until the top of the screws are flush with the metal cover. DO NOT remove the screws entirely. See Figure 39.

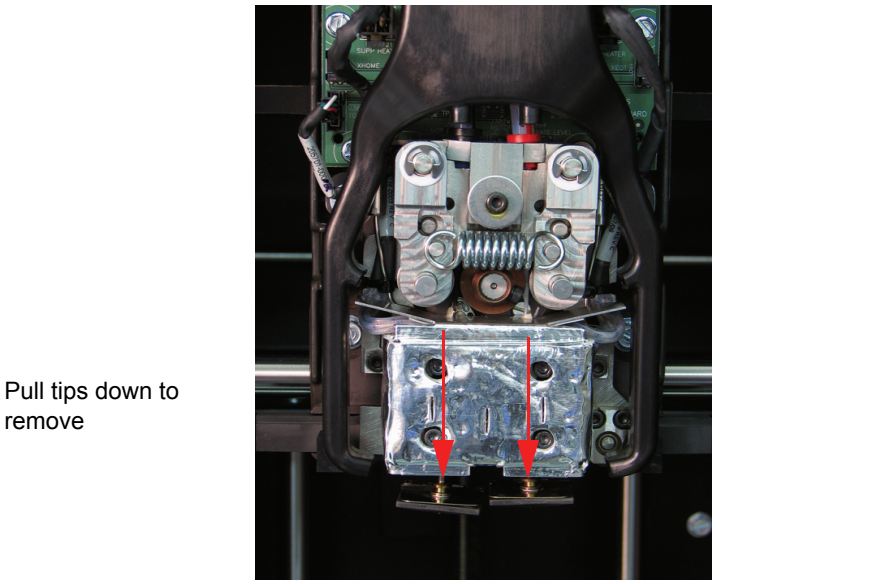
Figure 39: Tip Removal



B. Use needle nose pliers to grasp the stainless steel shield of the tip.

C. Pull the tip shield toward you, then pull down to remove the tip. Discard the used tip. See Figure 40.

Figure 40: Remove the tips

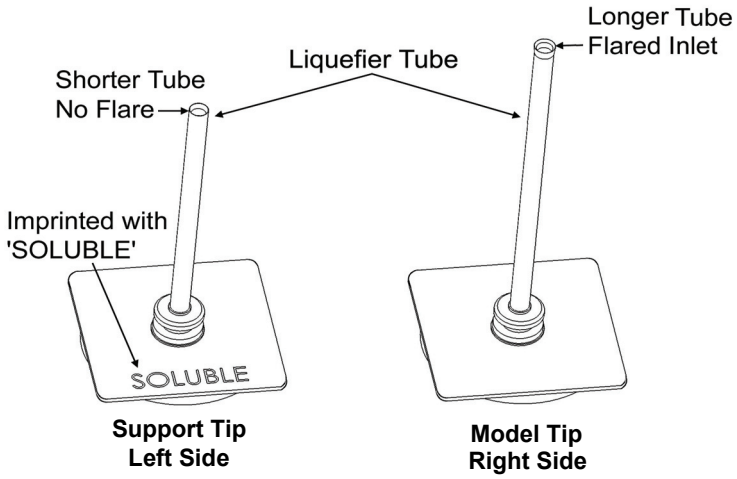


D. Repeat for second tip if necessary.

Installing Tips:

1. For *uPrint* 3D Printer, you must identify the correct replacement tip. You must make sure a SUPPORT tip is used on the LEFT side of the head assembly. A MODEL tip must be used on the RIGHT side of the head assembly (See Figure 41). The Model tip comes in a red capped container. The Support tip comes in a black capped container.

Figure 41: Identifying Tips

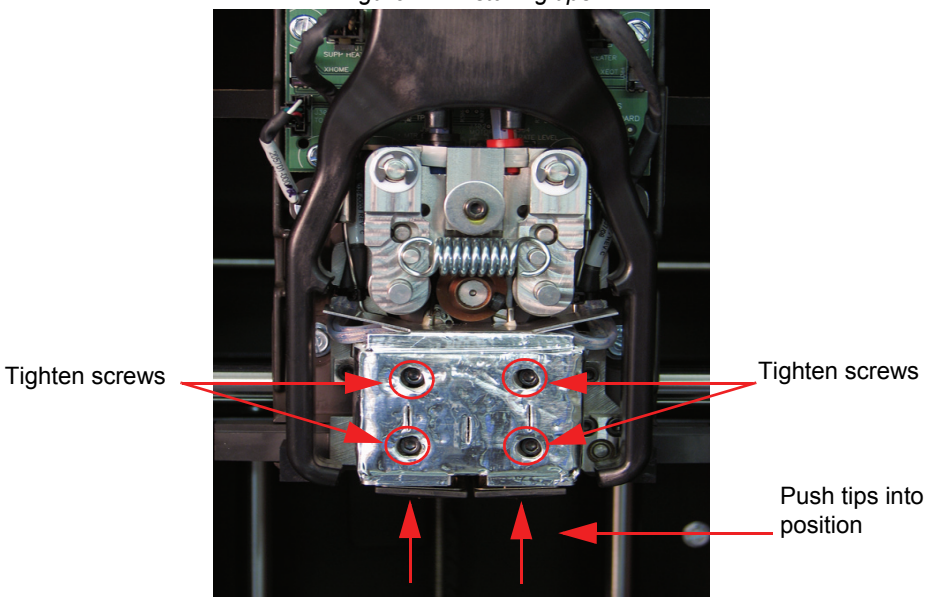


2. Place the tip shield on the tip.
3. With gloved hand, insert the new tip into the heater block. The slotted side towards the rear of the printer.
4. Use needle nose pliers to grasp the stainless steel shield of the tip.
5. Pull the tip shield toward you, then lift up to install the tip.
6. Push the tip toward the back of the printer once it is all the way up against the heater block.
7. Verify the tip is fully inserted into the heater block and that the stainless steel shield is aligned (See Figure 42).
8. Use 7/64 T-Handle Allen wrench to firmly tighten the heater block clamp screws.

Note:

Make sure the tip remains all the way up against the heater block as you tighten the screws.

Figure 42: Installing tips



9. Repeat steps 3 through 8 for the other tip if necessary.
10. Replace Plastic Head Cover and close the printer door.
11. The printer will display **Tip Maintenance - Tips Replaced?** - press **Yes** to begin material load.
    A. The printer will display **Load Model - Replace Both Carriers** (flashing).
    - If you want to replace a material carrier, do so now (See "Installing a spool of material into the carrier:" on page 29 and "Adding material carriers to the single material bay" on page 31
    - If you do NOT want to change a material carrier, you must unlatch and latch the carriers to continue (Press the carrier forward to unlatch, then press it forward again to latch).

Note:

Because the material 'unloaded' during the tip replacement, the printer is in a material replacement mode. You must unlatch and then latch the carriers to continue.

If there is a delay in the unlatch/latch process, the printer will display **Both Carriers Not Replaced Or Invalid**. Select **Retry**, then unlatch and latch the carriers.

    B. The printer will now begin to load material. See "Installing a spool of material into the carrier:" on page 29 and "Adding material carriers to the material bay:" on page 31.
    C. After material Loading is complete the printer will display **Tip Calibration - Install Modeling Base And Build Calibration Part**.

Note:

Make sure a NEW modeling base is installed before starting calibration. Calibration results will be incorrect if a NEW modeling base is not used.

Tip Calibration:

Tip Replacement requires that Tip Calibration be performed.

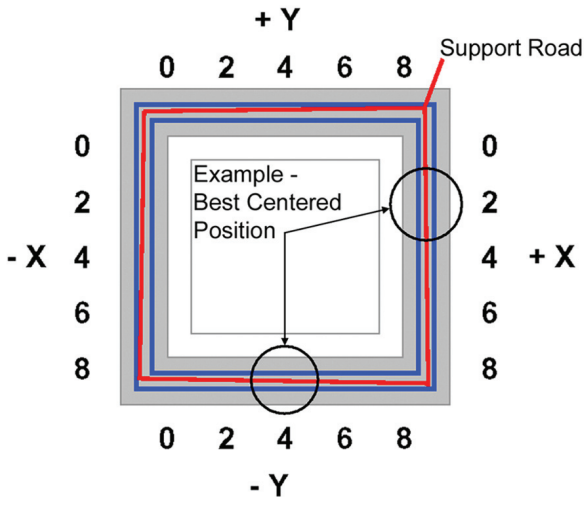
1. Select **Start Part** (flashing) - the printer will run two calibration parts.
    - The printer will automatically build a Z Calibration part, measure the part and calibrate the Z Axis for tip depth and tip level (approximately 5 minutes). The Z calibration is Automatic.
    - The printer will then automatically build an XY Calibration part (approximately 10 minutes). You must inspect the XY Calibration part and calibrate the X and Y axes for tip offset:
2. When the XY Calibration part is complete the printer will display **Remove Part and Select XY Adjustment - X:0, Y:0**
3. Remove the XY tip calibration part from the printer.
4. Inspect the part and calibrate the X and Y axes (See Figure 43).
    A. Use the magnifier from the Startup Kit to view the support road (shown in red).
    B. Identify the location on the +X **or** –X side of the part where the support road is best centered within the model boundaries (shown in blue).
    C. Read the number closest to this location. This is the required X Tip Offset adjustment, in mils. If the number is on the -X side, a negative offset is required.

D. Select **Increment** or **Decrement** to input the X offset adjustment - the value will change in the upper display window (by default, the printer will be ready to accept the X value).

E. When you are satisfied with your X offset value, **Select Y** and repeat steps A- D to identify and input the required Y Tip Offset adjustment.

5. Select **Done** after you have input the X and Y offsets. The printer will return to **Maintenance**. Run the XY calibration a second time to be sure the values changed the offset properly.

Figure 43: Example XY Tip Offset Part.
This example requires an adjustment of X = + 2 mils, Y = - 4 mils



Remove Debris Buildup

Remove all material buildup on the Z Platform and around the lead screw. Failure to do so could cause the base to not be level or the Z Platform to jam at its upper limit.

Vacuum Build Chamber

Vacuum the build chamber to remove all debris and purged material.

Clean Door

Do not use glass cleaner on the door. It will damage the acrylic window.

CAUTION

ONLY use acrylic cleaner.

Chamber Light Bar

Replace chamber light bar:

1. Power down the printer.
2. Locate the wiring harness leading away from the bottom of the light bar.
3. Disconnect the light bar from the wiring harness by squeezing the wiring harness clip while pulling down.
4. Remove the light bar by removing the 3 attachment screws (top, middle, bottom) - use the 7/64 T-handle wrench supplied in the Startup Kit.
5. Install a replacement light bar with the 3 attachment screws - do not overtighten the screws.
6. Re-attach the wiring harness lead.

Support

Registration

To register your *uPrint* 3D printer, visit http://www.uprintdimension.com/productinformation/customerinfo

Customer Support

Visit http://www.uPrintDimension.com for the following:

- How to order consumable parts for your *uPrint* printer.
- Technical support contact information for your *uPrint* printer.
- Technical support for your SST tank.
- Part finishing information.

When contacting technical support please provide the following:

By phone:

- System Model.
- System Serial Number.
- System Software Build number.
- Detailed description of the problem you are experiencing.
- Please try to be near the printer for troubleshooting, if possible.

By email:

- System Model.
- System Serial Number.
- Your Name.
- Your telephone number.
- Detailed description of the problem you are experiencing.

For advanced troubleshooting (provide by email):

- System CFG file.
- STL and/or CMB files.
- Detailed photographs showing the issue.

Recycling

Recycle all materials per your local recycling guidelines.

Table 1: Material properties

System Component	Materials	Recycling Code
Model material guide (red, both halves)	ABS	
Material retaining clip (yellow)	ABS	
Support material guide (black, both halves)	ACETAL	
Material Carrier (clear top, black bottom and bottom cover. Latches, hinge pin and electronics not included)	PC	
Material Spool & lid (gray)	PS - HI	
EEproms	Electronics	
All cardboard can be recycled per your local recycling guidelines.		

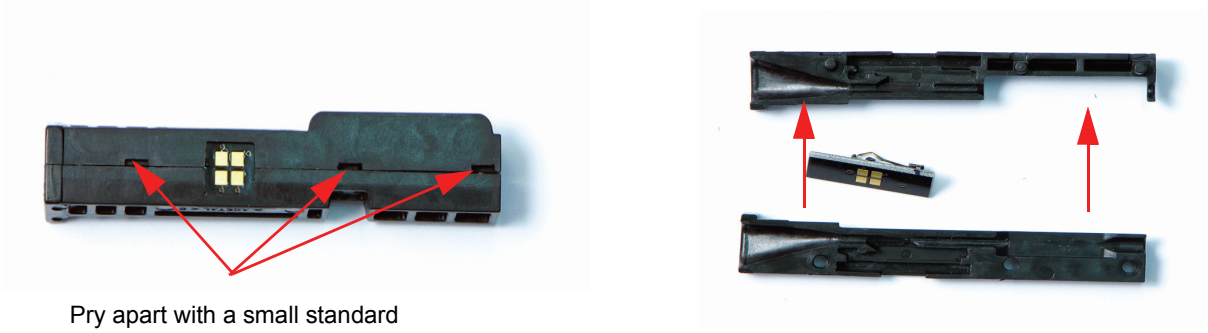
Follow your local recycling guidelines when recycling electronic components.

Removing the EEproms from the material guides

1. Open the model and support material carriers and remove the material guides.
2. With a small standard screwdriver, pry the two material guide halves apart. See Figure 44 and Figure 45.

Figure 44: Pry the model material guide apart

Figure 45: Pry the support material guide apart



3. Recycle the EEPROM per your local electronics recycling guidelines.
4. Recycle the material guides per your local guidelines. See Table 1 on page 66.

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